



LONMARK®
INTERNATIONAL

LONMARK®

Empowering
Intelligent
Energy Solutions

M A G A Z I N E Vol. 9 | Issue 1 | January 2018 | www.lonmark.org

NEWS

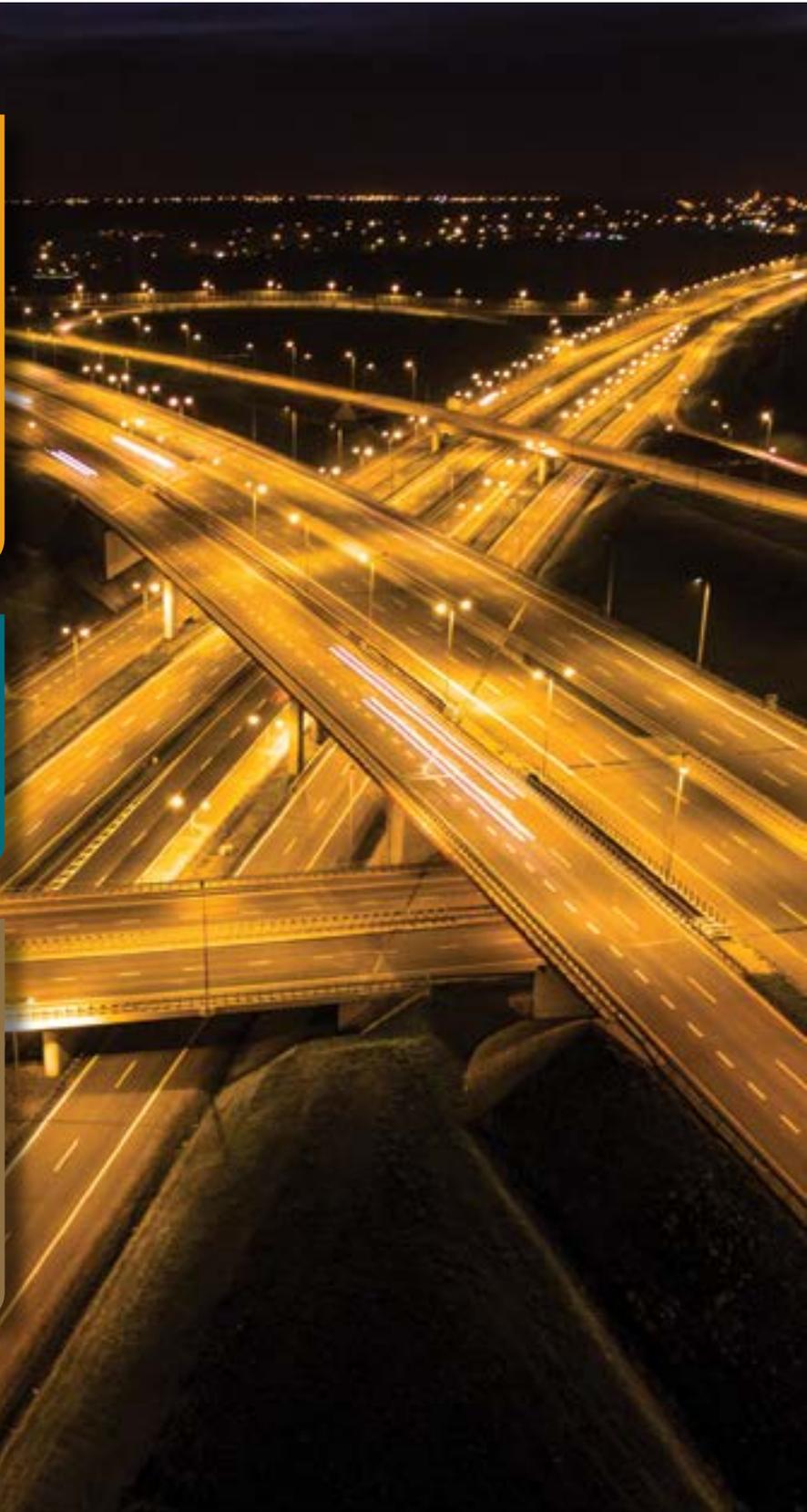
- Smart Cities + Buildings = LonMark at L+B
- A System Integrator Profile: Western Allied
- LonMark Training, Resource Library, and User Forum Ramping Up

FEATURES

- Troubleshooting in the IOT
- Smart City Data Digitalization
- The Future of Open Systems

CASE STUDIES

- Hospital Gas Management System
- Smart Lighting for the Polish A1 Motorway
- Les Mureaux, France Advanced Lighting Solution



www.lmimagazine.com

Editor-in-Chief
Ron Bernstein

Managing Editor
Shannon Mayette

Copy Editors
Henny van de Bovenkamp,
Sharon Calcagno, Ernst Eder,
Ron Bernstein



LONMARK®
INTERNATIONAL

LONMARK International
2901 Patrick Henry Drive
Santa Clara, CA 95054
Tel. +1 408 938 5266
Fax +1 408 790 3838
marketing@lonmark.org
www.lonmark.org

Produced by MINDSET
www.mindset.nl

Further editorial use of the articles
in the magazine is encouraged.

For subscriptions, circulation and
change of address enquiries, e-mail
marketing@lonmark.org

For editorial and advertising
opportunities contact
marketing@lonmark.org

The views expressed in this magazine are
not necessarily those held by LONMARK
International or the publisher.
The publisher shall not be under any liability
whatsoever with respect to the contents of
contributed articles. The Editorial Board
reserves the right to edit, abridge or alter articles
for publication. LONMARK and the LONMARK
Logo are registered trademarks
of LONMARK International in the U.S.
and other jurisdictions.
All other trademarks are the property of their
respective owners. Copyright 2018 by
LONMARK International. All rights reserved.
No reprinting, distribution, or posting without
prior written consent from LONMARK
International.

CONTENTS

3 Executive Letter by Ron Bernstein

NEWS

- 4 New LonMark Members
- 5 Best of Year Award Winners
- 7 LonMark Around The Globe
- 10 Light + Building 2018
- 11 LonMark SCC
- 12 New Certified Products
- 39 Western Allied - A System Integrator Profile

FEATURES

- 16 LON Troubleshooting in the IoT
- 18 Being a Smart City Isn't Just About Having Fast Internet
- 26 The Currency of the IoT and the Lifeblood of AI
- 30 An Integrated Approach for Smart City and IoT
- 34 Wireless LON® Through w2lon
- 36 Re-inventing Lighting with Intelligent Mesh Network

NEW PRODUCT

- 40 Galaxy Occitaline Continues its Expansion
- 44 New High-Speed Communication Standard for Smart Cities

TRAINING

- 6 LonMark Training and Testing Online

CASE STUDIES

- 22 SafeSquare Gas Management System
- 28 Smart Lighting for Polish Motorway
- 42 Citylone and the City of Les Mureaux



Cover photo source:
Apanet Green System

LONMARK Mission

LONMARK International is the recognized industry authority for certification, education, and promotion of interoperability standards for the benefit of manufacturers, integrators, and end users. LONMARK International's mission is to enable the easy integration of multi-vendor systems based on ISO/IEC 14908-1 and related standards.

Executive Letter



A Look Forward

by Ron Bernstein, LonMark Executive Director and CEO

This issue of the LonMark Magazine highlights some great new advancements for control networking solutions. It has been a busy time for LonMark around the world. Several new technologies have been introduced to LonMark and will shortly become new international standards furthering the ability of markets to embrace open interoperable LonMark standards for intelligent control networking. In addition, several very positive initiatives have been initiated to create an even stronger global organization.

On the technology front, our Technical Director's article highlights four new developments: LON IP channel; HD-PLC Powerline channel; ISM-RF channel; and the new LonMark Web Services effort.

Direct access from sensor to web application

The three new channels will enable new IoT applications for smart buildings, smart cities, smart homes, and more coming to the market soon based on these new technologies. And the new Web Services standard will support the growing IoT and cloud based applications market with direct access from sensor to web application, opening up greater support for increased value of installed smart networked devices. Already we're seeing new smart city applications for more than just street lighting including parking space location detection, environmental sensor grids, security and safety sensor. Our new Smart Cities Council is leading the charge with new products, technologies, promotional and support efforts to educate the market about the value of multi-vendor, open systems.

Interoperability reduces complexity, and enables flexibility

LONMARK certified products have and will continue to be interoperable from the very first products installed 25 years ago to ones shipping today. There has never been a question if a product will integrate, there has never been a "Plug-Fest", there is just no need since the LonMark Interoperability Guidelines and the certification process guarantees interoperability, which reduces costs, reduces complexity, and enables flexibility, choices of vendors, and ensures innovation. LonMark recently released version 16 of the Device Resource Files (DRFs) which include all of the new profiles supporting a wide range of new device applications for building automation, room automation, energy management, and smart city applications. To support our global growth initiatives, we are enacting some organizational structure changes uniting our long-time affiliate in Germany with LonMark International. This change enables our growing organization to achieve greater marketing, education, and technical alignment globally while ensuring local and regional support. The adage, "Think Globally, Act Locally" is key to our vision and we are excited to support our members through this initiative.

Close to 1000 certified professionals

We continue to ensure our vision of being the market leader by enhancing our education, training, certification, and related programs. Last year LonMark announced a new online, web-based training and certification platform. This platform has been highly successful by ensuring anyone, anywhere in the world can become a LonMark Certified Professional and improve their value in the market. We've begun a new project to enhance the promotion and search capability of our online database to support this growing team of experts.

This year, we set another goal of creating even more comprehensive online training classes for LonMark including an introduction to LonMark networking and a full network design class. These new classes will teach the fundamentals of control networking, LonMark technology and standards, and practical installation, commissioning, and troubleshooting skills. This online, self-paced program is in response to our members' requirements to train a new, younger work force. Look for an announcement this year when the classes are available.

We are proud to be the global go-to solution for true open control networking solutions. Our members are key to ensuring this vision is vibrant, strong, and will continue to grow for many years to come. We welcome our new members and appreciate those that have been the backbone of our success for over 25 years.

New

LONMARK® Members

Ayla Networks

Ayla Networks empowers leading manufacturers by simplifying the inherent complexity of the Internet of Things (IoT), enabling them to turn their products into smart connected systems and transform their businesses to compete in the game-changing world of connectivity. Delivered as a cloud platform-as-a-service (PaaS), Ayla's IoT platform provides the flexibility and modularity to enable rapid changes to practically any type of device, cloud or app environment.



With more than 20 years' experience in management of communicating automata, ARCOM Groupe proposes innovative solutions tailored to the needs in regulation, automata and industrial software.

From development to manufacturing, selling and integration, ARCOM is a market leader in France for automatism solutions. Their range of products allows global management of room comfort - HVAC, air quality, blinds, lighting - for offices, hospitals and schools. ARCOM proposes to manage all elements with one single regulator.



sensorFact provides frictionless access to real-time sensor data for facility management companies and professionals empowering you with up-to-the-minute information necessary to perform your work. We do this by making real-time live building automation system (BAS) data accessible safely, quickly and easily for facility maintenance teams, call centers, system integrators and asset managers helping save time and money.



Wirepas is focused on providing the most reliable, optimized, scalable and easy to use device connectivity for its customers. Wirepas Connectivity is a de-centralized radio communications protocol that can

LonMark International would like to welcome our new members committed to the development, manufacture and use of open, multi-vendor control systems utilizing ISO/IEC 14908-1 and related standards.

be used in any device, with any radio chip and on any radio band and is currently developing a RF transceiver for LonMark.



Performance Automation Solutions, Inc. (PAS) is a woman-owned small business specializing in building automation and systems integration for HVAC, lighting and access control. Based in Southern California, PAS holds C-7, B, C-20, C-36 and C-16 licenses. PAS has extensive expertise in multi-protocol integration and design.



Nortec (Member of the Condair Group) is the world's leading humidifier and evaporative cooling manufacturer. Nortec sets the standard for innovative, energy-efficient and hygienic solutions.

Panasonic

Panasonic Corporation is a worldwide leader in the development of diverse electronics technologies and solutions for customers in the consumer electronics, housing, automotive, and B2B businesses.

Best of Year Award 2017

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 2017 Best of Year Award winners:

Multi-Vendor Project of the Year (Large): ISDE is being recognized for the management and improvement of the building management systems for the APILAC Building for the Port Administration of Lazaro Cardenas SA de CV.

Multi-Vendor Project of the Year (Small-repeatable): Aditel for its Integrated Control System for ING Bank N.V.'s new headquarters in Madrid, Spain.

Certified Product of the Year: STV Powerhouse PL:

This LonMark standard-based product family provides an interoperable device definition that makes it possible for a system integration company to deliver a system where sub meter nodes (devices) from different manufacturers can be integrated with a minimum amount of effort.



Visionary of the Year: Jörg Schneck

General Manager Sales & Marketing Vossloh-Schwabe Deutschland GmbH

Jörg is the chair and a very active member of the Smart City Council and has lead the technical effort in the development of two new channels, LON HD-PLC and LON ISM-RF. He is now moving forward with the "neighboring protocols". He continues to recruit new members and is an advocate for the use of LON technology. Jörg has been a long-time supporter, innovator, and contributor to LonMark's efforts. We are proud to honor him as our Visionary of the Year.



Honorary Award: Mitch Slavensky

ACS Controls

Mitch Slavensky, a founder of LonMark America, an LMI board member, and a key advocate for LonMark for over two decades is the recipient of this year's Honorary Award. Mitch was a long-time supporter and integrator of LonWorks solutions based in Sacramento, CA. He was a member of the Open Systems Alliance and co-author of the first LonWorks open building automation specification published by LonMark in the late 1990s. Mitch's company, ACS Controls, has been a longtime member of LonMark International. Sadly, Mitch passed away this October. He will be greatly missed but he will be remembered with great admiration for his dedication, passion and contribution to the industry.



LonMark Resource Library



In 2018, LMI will undertake a new project to significantly enhance the availability and access to a large library of educational information collected over many years. There will be a new searchable database with easy access to this information including seminars, videos, documents, and more. Be sure to check LonMark's monthly newsletter for more information on when the new database will be made available.

New Member Forum Tool

To help you leverage the benefits of your membership all LonMark Forums are utilizing BASECAMP to manage and organize various projects and activities. BASECAMP is a simple way to see the status of a project as well as outstanding actions in a timely fashion. LonMark members may request access to any member projects. All active LonMark Committees and Task Groups have a BASECAMP project folder where committee documents, meeting notes, and discussions are found. To gain access to a specific forum and its activities please contact tech@lonmark.org.

TRAINING

LonMark Certification Training and Testing Now Offered Online, Anywhere

LonMark International launched a LonMark Certification Training and Testing suite that provides the industry with a more accessible and global program. The program is fully online and self-paced, which offers students the ability to study and prepare for the LonMark Certified Professional (LCP) test in the comfort of their office or home. There is no longer a need to travel to a testing center making the program substantially more affordable and accessible.

The primary goal of the program is to create a proficiency standard helping to assure end users that they receive a solution that fits their exact installation and performance requirements.

The building automation and refresher classes are currently available in English and the LonMark Certified Professional test is available in English, German, and Spanish with Japanese in development.

Throughout 2018 LMI will be offering several new training classes on core technology through the LonMark Credentialing Institute including the following:

1. An Introduction to LonMark Technology
2. LonMark Network Design

Both classes will follow the online, self-passed learning model available now.

For more information, registration, and program details visit www.lonmark.org/training



LONMARK®
INTERNATIONAL

LonMark Around the Globe

Asia

Japan Open Seminar

Kyoto University hosted an open LonMark seminar for faculty and students presented by several LonMark board members in November 2017 as part of a three-day conference and meeting coordinated by LonMark Japan. Discussions on IoT, next generation building technology and LonMark's new technical activity was followed by a Q&A session. Members of the board also toured LonMark Member M-Systems to see first hand how LON has been integrated into their facility, production line, and their products.

LonMark Japan will host their annual open systems conference again in 2018.

For more information, contact_tomita@lmjapan.org.



Guangzhou Electrical Building Technology

LonMark Ambassadors Kevin Kwan and Eric Sun hosted a workshop at the Guangzhou Electrical Building Technology 2017 which had approximately 50 attendees including device manufacturers and integrators.



The workshop titled: LonMark International Empowers Intelligent Control Networking Solutions: New Technology Advancements for Building Automation and Smart Cities provided an overview of four new technologies in development at LonMark:

- New LonWorks High Speed/High Performance Power Line Communication Channel
- New Hi Performance RF Communication Channel for LonWorks
- New LonMark IP Channel Definition Standard with Support for IPV6
- New LonMark Web Services Standard for Enterprise and Cross Platform Application Support
- Use cases for building automation, smart city applications including street lighting, and others were discussed.

> Shanghai International Lighting Fair

LonMark International had a strong presence at SBIT showcasing intelligent control network technology solutions as well as new technology to enhance the building automation and intelligent city development.

LonMark International, a long-time sponsor and supporter of SIBT, exhibited in booth W3B49. There was a demonstration with members Gesytec and MegaChips, which featured the new proposed international LonMark standard for High Definition Power line Carrier Media (HD-PLC/LON) Channel. This new transport media offers over 1MB/sec data rates using existing wiring in buildings and cities, opening up vast new opportunities for control, monitoring, and management of networked equipment and advanced IoT applications.

In addition, two additional media channels were showcased including LON over IP and LON over Mesh RF. Both were proposed as new international standards for building automation.

LonMark's Ambassador Kevin Kwan presented a free educational session on Sept. 5th titled: LonMark International Empowers Intelligent Control Networking Solutions: New Technology Advancements for Building Automation and Smart Cities. Over 60 people attended with great interest and questions.



Americas

GWAC Transactive Energy Systems Conference:

The fourth International Transactive Energy (TES2017) conference was held in Portland, Oregon on June 13-15, 2017. The conference covered a wide range of topics relating to the smart grid, transactive energy and distributed energy resources (DERs). An emerging trend is the discussion of smart cities and how they can use transactive energy systems to integrate various technologies to effectively manage the resources of a city in a secure manner.

The TES 2017 Experiences from Smart Cities panel included representatives from utilities, companies that manufacture products or control network platforms used by devices in smart cities, as well as distributed energy consultants, and Internet or smart grid solution providers.

Ron Bernstein, CEO for LonMark International and Member of GridWise Architecture Council (GWAC), was moderator for the smart cities panel and LonMark Sponsor Echelon was represented by CEO Ron Sege.



Matelec Latinoamérica, Santiago Chile

LonMark International had a strong presence at MATELEC Latinoamerica in Chile this October showcasing intelligent control networking technology to enhance development for building automation and smart cities.

LonMark Cono Sur hosted an exhibit which included demonstrations with LonMark certified products showcasing applications for building automation and street lighting. These demos involved co-exhibitors ISDE and ADITEL from Spain and SIDCO from Chile, both members of LonMark Cono Sur.

ISDE and ADITEL featured products and services certified by LonMark and used for a wide range of solutions in the control and energy efficiency arena. SIDCO highlighted integrated solutions for street lighting and building automation using FTT Bus and PLC transport media and LonWorks protocol with open HMI applications. In addition, LonMark showcased strong capabilities in environments where intelligent networks are needed as well as highlighted the importance of its training programs for users, certified professionals and integrators.

Two free educational sessions took place on Oct 5th. LonMark Cono Sur President Hernán Fagnilli, presented a session titled: Advances of new technologies in buildings automation and smart cities, and César Martínez from ISDE presented a session titled: Implementation of control's architecture and multi-sites supervision via IP protocol under ISO 14908. Over 30 people attended both sessions with great interest and questions.

Plans are underway for additional events and seminars in Latin America for 2018. LMI members are invited to participate in this rapidly emerging market where LonMark is developing a strong presence.

AHR EXPO 2018

Interest in LonMark and our initiatives continues to be strong, demonstrated by record attendance at LonMark's educational seminar program at AHR Expo last year. For 2018 we once again are planning for standing room only for our day of education sessions:

AHR LonMark Education Sessions for 2018 include:

- GWAC, GMLC, CABA, and LONMARK to hold a two- hour seminar focusing on Smart Buildings and the Smart Grid
- Beyond HVAC Using the ASHRAE Multi-Tier Architecture: Integration of Building Systems using a Common Building Control Networking and Management Platform
- Back to Basics: An Introduction to LonWorks Control Networking, Building Automation, and Building Automation/ Management Systems
- Managing Your Building – Practical Control Network Design, Installation, and Management Tutorial
- Keeping You Up-To-Date: What's New with LonMark Members' - New Products, Applications, Tools, and Solutions
- Technology Primer: Key New Building Technologies in Development That Will Change Your Business Including RF, Powerline, IP, IoT, and more
- Industry Trends Panel: Beyond the Building – Applying Smart Building System Concepts to Smart Cities, Smart Grid, and Distributed Energy Management

Be sure to stop by the LonMark booth 4227 to see a demo with members Gesytec and Megachips, which will feature the new proposed international LonMark standard for High Definition Powerline Carrier Media (HD-PLC/LON) Channel. This new transport media offers over 1MB/sec data rates using existing wiring in buildings and cities, opening up vast new opportunities for control, monitoring and management of networked equipment and advanced IoT applications. Also, a demonstration by Occit-aline will feature new multi-protocol routing technology and a cross-platform integration in-a-box solution.

All conference seminar slides and audio files will be available on the LonMark website at www.lonmark.org/presentations

> EMEA
Light + Building 2018

For the third consecutive show, LonMark International and the Smart Cities Council (SCC) will continue its presence at Light+Building 2018 by exhibiting in the Urban Lighting area located in Hall 5-D29 of Messe Frankfurt.



We are pleased that the following members will join us at our stand: Apanet, Amko Solara, Citylone, Echelon, Flashnet, Megachips, Rongwen, Streetlight. Vision, Vossloh Schwabe, Wirepas and who mbH.

Smart city concept

At the booth, members will present a smart city concept which will demonstrate:

- An RF based solution LON ISM-RF
- A LON High-Definition Power Line Communication (LON HD-PLC) transceiver
- Smart city applications with sensors, an EV charging system, video systems, and other sensors.
- Solutions that fulfill the requirements of a smart streetlighting solution and provides the opportunity to expand applications in a smart city.

LonMark booths in hall 5.0 and hall 9.1

To be able to showcase a complete smart city solution, smart buildings are a key part of the overall solution. We are very excited that this year the LonMark booths in hall 5.0 and hall 9.1 will be connected together in both stands showcasing the only open interoperable solution for Smart Building and Smart City control networking solutions.

Building market place

In hall 9.1-D60 LonMark Germany will present a market place for Open Building Automation, which includes a technology and presentation area. Speakers for LonMark include: Jörg Schneck (Vossloh Schwabe), Michael Ng (Amko), Joel Silverman (Megachips) and Ernst Eder (LonMark International).

LonMark members exhibiting the LonMark Germany stand are:

- ARIGO Software GmbH
- DH electronics GmbH
- Echelon BV
- Gesytec GmbH
- HGI Heger Gebäudeautomation Ingenieurgesellschaft mbH
- Kieback&Peter GmbH & Co. KG
- Occitaline SAS
- PASStec Industrie-Elektronik GmbH
- spega - spelsberg gebäudeautomation gmbh

All members are invited to participate in this fair. Please contact Henny Wieland for details on how we can help you promote your solutions – henny@lonmark.org.



LonMark International at Light + Building 2016

NEWS

The LonMark® Smart City Council "SCC"



by Henny Wieland, Secretary, LonMark Smart City Council

Smart Cities are a prime focus for LonMark International. Our strong support for the outdoor lighting market has enabled many new applications that are utilizing the existing control networking infrastructure of the smart city street lighting backbone. Municipalities worldwide are discovering the benefits of intelligent city infrastructure networks to reduce their network costs while improving light efficiency and safety.

It's now becoming strategic and compelling for cities to implement solutions to measure, analyze, and reduce electricity use in order to reduce energy spending, decrease maintenance costs, challenge their electricity providers, and contribute to the reduction of CO2 emissions. This infrastructure is also enabling a wide variety of valuable applications including environmental sensors, smart parking systems to reduce urban congestion, emergency service coordination, advanced security services, and many more.

Wireless solution

Who mbH, Wirepas, and Vossloh Schwabe are currently in the final stage of developing a LonMark wireless solution that fulfills the needs of a smart street-

lighting and also provides the opportunity for applications in a smart city. If a manufacturer offers this option, the RF-modules can be directly integrated with the lighting controller, so there is no need to replace the whole streetlighting module. The mode of operation is based on an open wireless LON ISM-RF transport network that is connected via a router with the city management system where the streetlights can be monitored, controlled, serviced, and updated. With the help of special protocols and algorithms an interface offers a smart and open connection to applications for the Internet-of-Things (IoT) like parking management, trash cans fill levels, or other sensors and solutions.

LON HD-PLC channel - One solution two providers:

Gesytec & Megachips and Panasonic & who are working on a new LON HD-PLC transceiver IEEE 1901-2010 HD-PLC (High Definition Power Line Communication) with a Data Transfer Rate > 1Mbps.

Workshop Covenant of Mayors

The Covenant of Mayors Office organized – in cooperation with the Committee of the Regions - the first networking meeting of the Covenant Community on

10 October 2017, in Brussels, on the occasion of the European Week of Regions and Cities. The event brought together all actors that, since 2008, have joined forces with cities to help make their aspirations a reality. National Ministries and Agencies, Regions, Provinces, National Associations of Local and Regional Governments, thematic agencies and the private sector are crucial partners for municipalities to design and implement their Energy and Climate Action Plans. It provided opportunities to discuss common challenges and look into successful actions on how to provide financial support to signatories, reinforce capacities, develop tools for Action Plans, and establish a multi-level governance dynamic at the local level. On behalf of the SCC Jörg Schneck and Henny Wieland – resp. chair and secretary – attended the workshop.

Key objectives

The LonMark Smart City Council (SCC) was formed to address the needs of smart city planners, managers, and solution providers. The key objectives of the Smart City Council are defined in the committee charter and we invite all to engage in this effort.

For information please contact Henny Wieland via email at henny@lonmark.org.



SCC F2F meeting, October 2017, Echelon office, Amersfoort

New LonMark Certified Products

Today thousands of companies are using LonWorks control networks to provide systems and solutions for building, home, industrial, telecommunications, transportation, and other industries. There are millions of LonWorks technology-based devices installed worldwide. The latest products certified by LonMark International:

OSRAM GmbH SLC Luminaire Controller LC

SLC Luminaire Controller LC is a control and monitoring device for outdoor lighting applications, such as street, parking, park or tunnel lighting, utilizing the LonWorks communication standard over power lines (Power Line Communication, PLC). Fixtures with magnetic and electronic ballasts and drivers with a 1-10V or a DALI interface can be managed by the SLC LC in terms of dimming, reporting and monitoring of the luminaire operating parameters.

SLC Luminaire Controller PC

SLC Luminaire Controller PC is an IP65 (water and dust) protected, control and monitoring device for outdoor lighting applications, such as street, parking, park or tunnel lighting, utilizing the LonWorks communication standard over power lines (Power Line Communication, PLC). Fixtures with magnetic and electronic ballasts and drivers with a 1-10V or a DALI interface can be managed by the SLC LC in terms of dimming, reporting and monitoring of the luminaire operating parameters.

Yaskawa America, Inc. SI-W3

Plug-in option card provides the ability to

connect Yaskawa 1000-series drives onto a LonWorks Network. Features the FFT-10A Free Topology Twisted-Pair Transceiver. Phoenix-style screw connector for quick and easy connection to the network.

Schneider Electric TAC Xenta 122-FC

TAC Xenta 122-FC is an easily programmable controller intended for both 2-pipe and 4-pipe applications, with or without re-heat. It can be configured for use with a multitude of valve actuator types, such as on/off, multistage, increase/decrease, PWM, and analog. The controller has different types of fan control and advanced fan control functions, including on/off delays, boosting, and conditioning.

Schneider Electric TAC Xenta 122-HP

TAC Xenta 122-HP is based on TAC Xenta 122-FC, but has a slightly different firmware, which is field downloadable. TAC Xenta 122-HP is particular suitable for heat pump control, including reversing valve control. It is an easily programmable controller intended for heat pump applications, with or without re-heat. It can be configured for use with a multitude of

compressor types, such as on/off, multi-stage, and analog.

Distech Controls, Inc. ECL-VAHSV2

The ECL-VAHSV2 controllers are microprocessor-based programmable variable air volume (VAV) controllers designed to control cooling only and cooling with reheat single duct VAV boxes. This updated 9-point VAV controller includes a robust hardware design, a drift-free NoZero calibration airflow sensor, improved power daisy-chaining performance and preloaded applications, all of which streamline installation and commissioning time. Each controller uses the LonTalk® communication protocol and is LonMark certified as an SCC VAV.

Distech Controls, Inc. ECL-VAV

The ECL-VAV controllers are microprocessor-based programmable variable air volume (VAV) controllers designed to control cooling only, cooling with reheat, dual duct, parallel fan and series fan VAV boxes. This updated 12-point VAV controller includes a robust hardware design, a drift-free NoZero calibration airflow sensor, extended power daisy-chaining performance, smart room control support and preloaded applications, all of which helping to streamline installation and commissioning time.

STV Automation Powerhouse FTT & STV Automation Powerhouse PL

STV adds to their SubMeter product family the PowerHouse FTT which connects digital AC meters with LON Free Topology network interface (FTT) for building automation and energy management. The SubMeter is used to provide basic power metering and ON/OFF control of a load by a remote control from a relay (switch). A very important objective for this product family is to provide an LonMark interoperable device definition that makes it possible for a system integration company to deliver a system where sub meter nodes (devices) from different manufacturers can be integrated with a minimum amount of effort.

New LonMark Infrastructure Products

Multi-protocol router - solving 90% of field problems: Occitaline has developed an innovative multi-protocol router "system in a box" well equipped for new BMS architectures with attractive new features for integrators and maintainers.

The all in one BMS protocol: LonWorks, Modbus, BACnet are all available on a

single platform with four ports. For each twisted pair and all protocols, a constant measure of impedance helps to ensure a constant connection.

A double Ethernet connection can be used as switch or double IP to respond to new or retro BMS projects needing to increase performance. A front LCD screen provides

detail on IP addresses and LonWorks bandwidth. A WIFI option can be activated on the screen and used for IP remote access.

Many diagnostics are available as a graphic and provide bandwidth for up to an hour. The configuration is operated with a simple wizard to enhance the installation process.

LonMark Technical Report

by Ernst Eder, Technical Director, LonMark International



The LonMark Board of Directors has initiated the creation of a new committee for standardization work of our newly developed media channels.

The LonMark Channel Standardization Committee was established in June 2017. The primary function of the **LonMark Channel Standardization Committee (LCSC)** is to assist LMI in creating the technical specifications for new transmission media for the Control Network Protocol as defined in ISO 14908-1:2012.

The first meeting was held on the 5th of July 2017 and the committee continues to hold regular meetings. LonMark International members, which are actively involved are Echelon, Gesytec, Megachips, Occitaline, Panasonic, Vossloh Schwabe, who, and Wirepas. With the mentioning of these companies, we want also to thank them for their time and contribution to the new committee and all their work on the channel definitions. If your company is interested in being part of the committee, please contact us at tech@lonmark.org

The Committee Charter can be found under the following link: www.lonmark.org/membership/member_committee.shtml

The current task of the committee is to write the standard specification for three new LonMark Channels, which should become an international standard in our 14908.x/709.x family. The first standard

document for LON IP is already done and submitted to the relevant standards bodies and will become EN14908.7/CTA708.7. The specification for LON HD-PLC and LON ISM-RF are in development and will be submitted soon to the standard bodies in Europe and the US, which are CEN-TC247 and ANSI/CTA-R7. In the following you will find more detailed information about the three new channels.

LON IP

This new development effort will define a standard for direct communication of LON messages on an IPv4 or IPv6 channel as opposed to the IP-852 IP tunneling standard. The development of this new media definition and middle layer OSI definitions will enable devices to communicate on any standard Ethernet network utilizing a direct communication model such as UDP or TCP to LON field devices. This new channel definition will be 100% interoperable with any LON

device certified by LonMark through the use of standard LON routers. Products utilizing this new communication stack may include building automation, home automation, smart city devices, bridges, network interfaces, gateways, and routers. This transceiver will be designed with commercial/residential building automation market's specific requirements for Ethernet backbone connectivity media and will also be suitable for other smart city and campus applications where combined twisted pair (FTT), PLC, RF, and IP based devices will interoperate.

LON HD-PLC (High Definition Power Line Carrier)

The HD-PLC channel type is a new technology soon to be a LonMark standard for high speed and high-performance power line communications for building automation, smart cities, and energy management applications. The HD-PLC channel is based on the

LONMARK: The Keys to Longevity

Proven, Reliable, Scalable



LONMARK Continues to Unlock New Opportunities

For more than two decades, LonMark has been THE pioneering source of open, interoperable control networking systems. With over 140 million installed devices, LonMark continues to adapt to meet industry demand.

- Over 150 standard device profiles: The foundation of interoperability
- No “Plug Fests” EVER – there has never been a need!
- Interoperability is guaranteed when using LonMark certified devices
- Designed for buildings, smart cities, process, transportation, and IoT applications
- Robust, simple network management tools
- Built-in network security and IP connectivity
- Lowest installation cost for customers

LonMark has certified over 1,000 industry professionals, and products based on the ISO/IEC 14908 standard are installed in more than 500,000 buildings worldwide.

The simple secret to LonMark's longevity? ***It Just Works!***

For more information, visit www.lonmark.org



LonMark Technical Report

> IEEE 1901 standard and will now add a full open interoperable application layer LON stack on top of the core transceiver.

We anticipate many new applications for this technology developed by several LonMark members. The new transceiver will become part of the ANSI/CTA 709 and ISO 14908 suite of open interoperable LonMark standards. This development project is to create a new higher speed communication transceiver for LON networks that runs over existing powerline (AC or DC) wiring or unpowered wire with very long distances. The current PL-20 standard runs at 4.9kbps, which is too slow for certain applications. The new media transceiver is anticipated to be in the megabit/second range. This new transceiver will be 100% interoperable with any LON device certified by LonMark through the use of standard LON routers.

Products utilizing this new transceiver may include: outdoor lighting, building automation, home automation, smart city devices, bridges, network interfaces, gateways, and routers.

RF LON capability

This development project is underway to create a meshing RF communication transceiver for LON networks that utilizes an industry standard radio 802.15.4 chip. The new media transceiver is anticipated to provide RF LON capability to field devices where power is available (not with batteries). This new transceiver will be 100% interoperable with any LON device certified by LonMark through the use of standard LON routers. It is anticipated that data rates greater than 1Mbit/second will be achieved. Products utilizing this new transceiver may include: outdoor lighting, building automation, home automation, smart city devices,

bridges, network interfaces, gateways, and routers. This transceiver will be designed with the outdoor lighting market's specific requirements for long distance, mixed terrain, and hybrid powerline/RF media and will also be suitable for other smart city and smart building/campus applications.

What is next on the radar for LonMark?

The next task will be the definition of the **NEW LON WEB SERVICES STANDARD FOR EN14908.x & ANSI/CTA 709.X.**

This new development will build upon the recent release of the LonMark Profiles (EN1409.6 & ANSI/CTA 709.6) by providing a web services template for all device profiles, communication services, and compatibility with the new LON over IP channel definition. This standard will enable IT devices (PCs, Tablets, Servers, and Smartphones) to communicate with APIs directly to LON devices using a standard set of web services. The web services standard will utilize LonMark's core interoperability device profile and object definitions, providing a “digital twin” of field device data and IoT virtual data objects. LonMark is uniquely positioned to extend this well-defined interoperability model to the IoT space. Applications include building automation, home automation, sensor networks, predictive maintenance, smart city applications, process applications, energy management, asset management, IoT, and others.

LonMark Resource Files 16.00

The most-recent set of the LonMark Resource Files (LMRFs), including the VDI 3813 profile set is ready for companies to use. The files can be found under the

following link: http://www.lonmark.org/technical_resources/resource_files/

These profiles are designed in collaboration with LonMark Deutschland and the profiles are based on the technical specification from the VDI Association. This is important to mention, because the VDI specification is set to become part of the international standard, ISO 16484-4 Building Automation and Control Systems – Part 4: Applications, once it is completed.

These new profiles will be brought to CEN and ANSI/CTA to extend the 14908.6 and 709.6 standards.

Call to action

We invite you to join LonMark's technical committees to help shape the future of intelligent control networking technologies.

Please contact tech@lonmark.org to learn more.

LON Troubleshooting in the IOT

by Greg Powell, Enerlon

It was a hot August day in Los Angeles, California. The Scotty Building manager, Marina, called me in a panic saying one of their high end tenants was sweating and had no air conditioning. It was a new LonWorks thermostat we had just installed last week.

“Could I send a technician right away?” She asked hopefully.

“I can be there in minutes” I replied. “Let me see if I can connect.”

Since I was miles away from the office building site, I could use remote communication capabilities to troubleshoot the issue. Rolling a service truck would take several hours especially in L.A. traffic on a sweltering Friday afternoon. But I needed to gather some information. I quizzed Marina for more details.

Who reported the issue? – the tenant. When did they notice it? – this morning. Was there an ID label on their thermostat? – Yes, AC26. What was the Suite number? – 216. Was there a digital display present on the thermostat? – Yes, it showed Unoccupied state. ‘Hmmm’, I wondered, ‘The Occupied schedule should have been sent to the device by the network webserver early in the morning’.

The first troubleshooting step

The first troubleshooting step would be

to verify my network management tool could communicate with the device. This was a LonWorks Network Services (LNS) based system that included a single network database and software that provided the network management services. Our company keeps the software tools and network databases for all our clients on a remote server located in the cloud hosted in a secure facility that is always available and includes regular backups as well. I launched Windows Remote Desktop from my laptop and logged into our AWS cloud server. On the networks that we create and manage sits a little device that provides remote connectivity over IP for network tools called a Remote Network Interface (RNI). The RNI has one CAT5 cable connected to the building IP network and another CAT5 cable attached to an FT-10 twisted pair device communication channel.

Before I started the network tool software I wanted to verify communication with the RNI. Inside the Windows Control Panel is an applet used to manage and test multiple RNI’s. I launched the

Lonworks Interface program and selected the XDefault.Scotty from the list of configured RNI’s. Then I clicked the Test button and observed the results. SUCCESS: xDriver diagnostics test passed. So, my tool could talk to the LonWorks network.

That started the hunt

Next I launched the LNS network management tool and opened it connected to the RNI attached and ONNET. I located the object in the network design page that represented the misbehaving thermostat for suite 216, mouse right clicked on it, then chose Manage from the pop up menu. I first wanted to see if the tool could talk to the device and selected Wink from the menu. ‘Cannot communicate with the device’ read the status message from the network tool software. That started the hunt. The device was a smart thermostat manufactured by Viconics. Since Marina had told me that there was a display on the digital thermostat screen I knew there was power to the device. But, somehow there was a disconnection between it and the tool. I located

another device on my network design page that was physically next door in suite 215 and verified that the tool could communicate with it. ‘Wink Passed’ was the message received. Next, from the Manage menu I selected ‘Test’. From the list of statistics in the device log I noticed a very high rate of transmission errors -65535. Transmission errors typically are caused by some sort of electrical noise or bad wiring connection on the communication channel.

I clicked the Clear Status button and a few seconds later pressed Test again. Now the Transmission errors were low – about 15. Every few seconds I pressed the test button and could see the errors were increasing at a rate of 15-20 per second. Something strange was taking place on the network media and I needed another tool that could provide a report of the channel health – a protocol analyzer.

It was scrolling pretty quickly

I launched the Echelon LonScanner (LSPA) application on my laptop and selected the x.Default.ScottyLSPA network interface when prompted. The web server device on the network at Scotty

Building included a LonScanner port that could report and analyze channel health remotely over IP. The LSPA connected successfully to the interface and the packet log began to roll across my screen displaying all LonTalk packets sent on the channel in real time. It was scrolling pretty quickly indicating a high traffic rate. Also, there were quite a few packets for destination subnet/node address 1/34 that included an ‘L’ attribute which indicates device communication issues. I switched back to my LNS network tool and checked the properties of the AC26 Viconics thermostat for suite 216. The subnet/node address was indeed 1/34 for this device. Back to the LonScanner analyzer and click the General Statistics button. Wow, 80% bandwidth was pretty high for this channel. That might also explain the high Transmission error rate seen in the device statistics log. A click on Packet Types in the LSPA and I found that over 60% of the packets were of Request/Response type. These indicated polling traffic and in the packet log I could see that it originated from node address 1/78. Over on my LNS tool I found the webserver device using the same 1/78 address. Ahhh, excessive web traffic was

taking place. Probably from multiple users with Scotty web pages open. A quick call to Marina and sure enough she had the Scotty building automation web pages open as well as her office assistant, the building engineer, and the building owner too. After getting everyone to close their web browsers I returned to the LSPA and low and behold – only 20% bandwidth now taking place. While the traffic on the channel was now at a reasonable rate I still could not communicate with the AC26 thermostat.

Always perform the TIT test

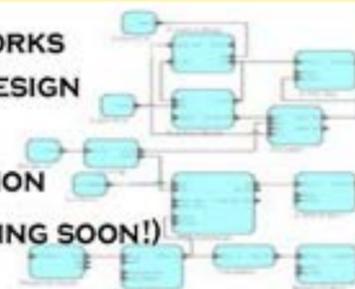
So, now the channel was healthy but the device was not. We’d need a site visit to check the communication channel wiring. Josh, our field technician was nearby so I dispatched him to stop by and check the FT-10 twisted pair communication cable wiring connection to the AC26 Viconics thermostat. One pull on the FT-10 cable and my suspicions were confirmed. A loose connection! After Josh made the repair communication with the device was restored, the thermostat began using the occupied set point, and the space began to cool off. The day was saved - under warranty of course. Now I’d have a conversation with my installer. Always perform the TIT test during installations - Tighten, Inspect, and Tug network terminal connections!

ENERLON DELIVERS LONWORKS INTEGRATION TRAINING



ECHELON AUTHORIZED NORTH AMERICA TRAINING PARTNER

- 101 INTRODUCTION TO LONWORKS
- 200 LONWORKS NETWORK DESIGN
- 300 LNS NETWORK TOOL
- 400 LONWORKS IP INTEGRATION
- 500 TROUBLESHOOTING (COMING SOON!)



CLASSES HELD IN SOUTHERN CALIFORNIA OR HOSTED REMOTELY AT CUSTOMER FACILITY

CLASS SCHEDULES POSTED WWW.ENERLON.COM

SKYPE 661-347-0619 TOLL FREE IN USA 1-888-363-7566 INFO@ENERLON.COM

Enerlon

In today's world of innovative technology, being a "smart city" isn't just about having fast internet



by Michael Ng, Amko Solara and LonMark Board Member & Ambassador

Officials around the world are gathering all types of data – on traffic flow, air quality levels, and energy consumption – to make their cities safer, healthier, and more efficient. The scope and definition of a smart city has recently broadened to include environmental sustainability, affordable and reliable transit, access to education, and a local economy with businesses that explore new technologies.

Although it sounds promising to make our cities smarter, some ethicists worry that as technology progresses, it will become harder for citizens to maintain privacy.

To maintain anonymity and freedom, the data needs to be encrypted, truncated, and filtered. The processes must be automated with machine learning on a carefully curated alert list of data to be collected for the safety and health of the citizens. A multi-vendor machine learning data exchange formats must be established. However, this is easier said than done.

Choosing the path of digitalizing

We discovered that to become such a city, the first and foremost is choosing the path of digitalizing. There are many aspects and ways to go about this path, but not without pitfalls and traps. Many large businesses want to own it all, designing the entire eco-system around their offerings and setting up barriers to competitors who want to enter. That will have a toll on the local economy and government who become hostages to the proprietary platform.

Therefore, the fair game is to have open standards and an open community where the local economy can come together and build the city's platform. This is a platform that plays nice for multiple protocols, networks, and layers. This is a platform that enables assets and spectrums to be shared. This is a platform that opens the data to be sliced for insights without losing security and privacy. This path leads to a digitalized city for every citizen.

Starting with streetlights, the power grid that connects the entire city to its outermost boundaries, they are the street furniture and real estate for the city to deploy the backbone of its network. They are the bridge providing power and connecting the fiber optical backhaul and the wireless networks. This creates the framework to build the [physical] network of the city to add 5G networks, Wi-Fi hotspots, street light control systems, LiDARs, 360 degree cameras, and other

IoT sensors. These assets can all work together [P2P network], exchanging data and optimizing the entire platform to do its job, serving the city and its citizens.

A platform that can grow on its own

This level of P2P framework, machine learning, and automation requires a visionary, vastly complex, and dynamic platform that can grow on its own. Just like artificial intelligence, this task is impossible with human manual intervention.

However, we found that all the existing solutions offered by large businesses dictate “eyes on glass” monitoring, manual remediation, and siloed data feeds. These eco-systems are generally over designed, restrictive, and over priced. We also found that by being too large, they are unaware and cannot adopt to changes to the needs of the city, businesses, and its citizens. A large software update is required to address the inadequacies and

rollouts cause long delays and inefficiencies. That is very expensive to the city and the economy.

Monitoring has to be fully automated with artificial intelligence and machine learning, the remediation must be self-healing/configurable, and the data must be on an open standard to allow it to be shared across unlimited platforms. The city needs an execution and financing partner that is well connected with innovators around the world to bring the latest visions into the “constant evolution” of the smart city.

No choice is more important

The world today is one of connected industrial assets, with an unprecedented capability to monitor and control these assets remotely. In the early planning stages of a Smart City/Internet of Things initiative, no choice is more important than the network wireless technology on which to build the environment.

That choice affects everything—from the devices that the services rely on to the network architecture that will define the deployment's performance, longevity, reliability, security, interoperability and scalability. When assessing the city's needs and goals, one has to be certain to make the choice for years, even decades.

As more products become internet-connected, even more data is generated and saved. Lately, the focus on data has shifted more and more towards the use of AI to forecast and predict. The more data the city collects, the more knowledgeable a system can be developed.

Engineers and product developers alike have to be responsible about how they specify requirements and think of the metrics, which their device will actively measure in the wild. What should be prioritized? Short bursts of data - a higher resolution within a smaller time frame or should it be spread evenly across the day? It always depends on the applica-



> tion. Each of the main technologies for transmitting data from IoT devices has its pros and cons.

M2M communication and IoT

Machine to Machine (M2M) communication and IoT is enabling many different and exciting new solutions for cities, utilities, and companies to better manage their assets, operations and environment. Folks using the networks to connect the various sensors and nodes deployed need to understand the various technologies available.

In a mesh network, IoT devices communicate with neighboring devices on their network, all of which can serve as conduits to the network base station. This allows for multiple, redundant connection paths, so unlike star-based networks, both single points of failure and black spots are dramatically reduced, or even eliminated entirely. In fact, as mesh networks scale, their reliability and performance improves because the possible communication paths multiply. Mesh networks devices tend transmit short distances which enable them to be power efficient, deliver long battery life and have more consistent data rates. A mesh architecture is essential for applications which require distributed computing or some local intelligence. These applica-

tions go beyond simple data acquisition and process locally-available information from in field devices to make quick, intelligent decisions.

LoRaWAN and NB-IoT networks are usually connected via a tower- or star-based topology. Commonly used in cellular networks, a star topology uses gateways (cellular towers, for example) that must have a direct connection to every device for that device to communicate. However, anything that obstructs the path from device to gateway (weather, construction or temporary obstacles) can impact a device's ability to remain connected to the network, which in turn compromises the reliability of the network and the services it carries. These obstructions are known as "black spots" or "shadows". In urban areas, the emergence of black spots could mean having to install more gateways to ensure a reliable connection for all devices, as many IoT devices are fixed in place and can't be moved to a better coverage location.

SigFox and LoRa are restricted by ETSI regulations on the 868MHz band that enforces a transmission duty cycle of 1% (which limits communication to 140 packets a day) and has a max packet size of 12 bytes. Also, WiFi data rate is based on 802.11 b/g/n standards, which are the

most commonly used standards for IoT WiFi solutions.

Made in a very cost-effective way

First off, LPWANs, such as SigFox and LoRaWAN, are solely for small amounts of data and non-real time applications - there is no guarantee that data has been received. By making simple sensor devices that do not make heavy computations, but instead send data directly (or sample it in intervals and then transmit), it is possible to drive these devices on single-cell batteries for several years! On top of this, these can be made in a very cost-effective way so large sensor networks can be created in secluded or hard-to-reach places, e.g. inside concrete walls or for measuring utilities.

Secondly, GSM is mostly for sending larger amounts of data and leveraging existing mobile network infrastructure. It requires more power, which means it almost have to be recharged somehow, either by renewable energy sources (solar panels or small wind turbines) or in fixed installations with a more permanent power source.

Last, but not least, WiFi is for streaming even larger amounts of data in real-time scenarios. WiFi is mostly used within smaller geographical areas, as infrastructure such as power and internet has to be in place for it to work. However, after having been setup, WiFi is relatively cheap in running costs as the only "subscription fee" is the utility costs for internet and power.

All in all, a communication technology exists for most applications, one does, however, have to account for all metrics, both in upstart, but also running costs and the characteristics.

<http://www.amkosolara.com/en/index.php>



CMNG Capital is a Smart City focused investment fund that provides the financing and integration of comprehensive smart city infrastructure solutions for global municipalities



Smart Street Lights

In today's world of innovative technology, being a "smart city" isn't just about having fast internet.

Officials around the world are gathering all types of data – on traffic flow, air quality levels, and energy consumption – to make their cities safer, healthier, and more efficient. The scope and definition of a smart city has recently broadened to include environmental sustainability, affordable and reliable transit, access to education, and a local economy with businesses that explore new technologies.



Public Private Partnership

We are implementing energy-efficient streetlights, public-wifi, security surveillance, outdoor smart sensors, central management systems and data analytics for the city and the public. Designed on a platform for rapid deployment of scalable, intelligent, IoT networks, we leverage the data to improve infrastructure, planning, and human services as a system of systems - with the goal of making cities more desirable, livable, sustainable, and green.

Our solutions are scalable and deeply engage our clients from the first meeting. Our solutions



Smart City Solutions

will allow cities without vast expertise and resources to install best in class smart city technologies without the enormous capital expenditure and risks of implementation. Specifically the fund and Management will focus on investment opportunities in projects structured as Energy Performance Contracts (EPCs) and innovative business models in the Internet of Things.

Our team has vast experience working with governments, policies and regulations, public lighting infrastructure, smart city infrastructure, legal

structures, financial services and investment banking in multiple regions.

The city needs an execution and financing partner that is well connected with innovators around the world to bring the latest visions into the "constant evolution" of the smart city. We can deliver that.

For more information, please visit us at cmngcapital.com

MAKING CITIES MORE SUSTAINABLE, DESIRABLE, LIVEABLE AND GREEN



Progressive development of a Gas Management System

by Martin Mentzel, SafeSquare

“To fulfill the high-level day-to-day hospital standards, any time and 24 hours around the clock”

For more than 50 years Drägerwerk AG, an International leading enterprise in the fields of medical and functional safety technology, has been planning and building Gas Management Systems for hospitals. Life and health of patients needing artificial respiration depend on respiration and anesthesia equipment working extremely reliably, in particular regarding the safe and constant supply of medical gases.

The Challenge:

The precondition is a Gas Management System, which fulfills the high-level day-to-day hospital standards, any time and 24 hours around the clock. Medical gases are, for example, oxygen, pressured air, laughing gas and carbon dioxide. In addition, the Gas Management System is responsible for the provision of vacuum. These medical gases as well as vacuum are produced, distributed and monitored within the hospital.

In particular for monitoring tasks, an Alarm Management System has been selected which is based on the LON free topology technology. Within the scope of a LON network several specialized components are deployed for collecting sensor data, for generating alarms and for connecting to a building management system (BMS). The project: the existing system had to be modernized and enhanced in order to meet the following requirements:

- Design and development of an enhanced communication method in order to yield a higher system performance and scalability;
- Integration of analog sensors of pressure, flow and gas concentration including qualified alarms;
- Improved support of the installation and commissioning processes (cabling, device connectors, terminators, etc.);
- Enhanced and improved functions of the existing commissioning tools (LNS based);
- Design and development of fundamental principles and methods regarding present and future software testing methods in order to comply more effectively with the stringent requirements of medical products, including product certification.



The Solution:

In order to implement the project both during the concept and development phases Dräger has chosen to adopt the proven engineering methods of SafeSquare. Therefore, Dräger carried out a successful audit of the SafeSquare quality management procedures pertaining to the relevant standards DIN EN ISO 13485 and IEC 62304 (Software development).

The Results:

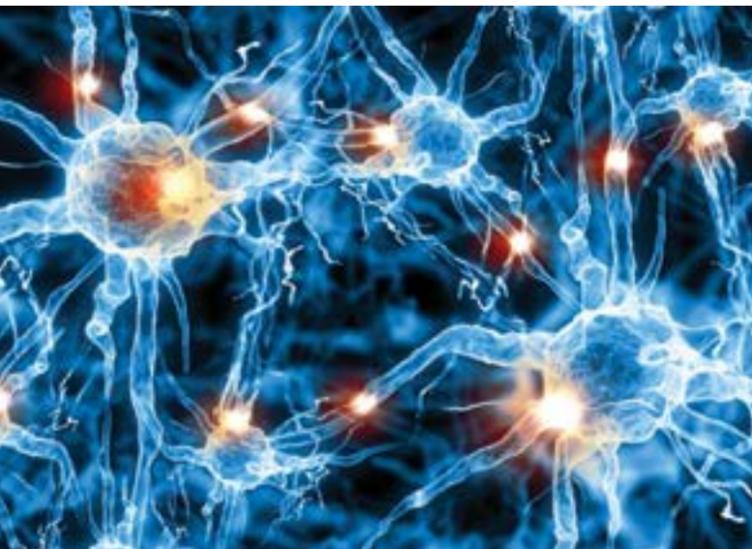
All results were delivered within the scope of the agreed time schedule and in compliance with the detailed project requirements:

- Development concept comprising a new and backwards compatible communication concept based on LonMark conformant mechanisms. As a result, the system performance

could be increased significantly, and the system scalability could be enlarged by several factors;

- Analog input module with 6 analog 4-20 mA inputs and 6 digital inputs including safety relevant diagnosis functions implemented in hardware;
- Latest version of LNS based commissioning tools AS-NetPro, including enhancements and improvements as well as backward compatibility;

- Development of an easy to use LNS based testing tool AS-NetCheck to be used by professional installation engineers;
- Development of a black box test bench for performing regression tests according to IEC 62304 including the generation of test protocols.



LON based Hardware and Software Developments

Hardware and Software development projects provided by SafeSquare ensure highest quality and reliability based on long-standing industry-experience, comprising, in particular, networking, availability, functional safety and security.

- Embedded hardware
- Application software
- Various communication stack implementations
- Safety related hardware, software and tools
- Automation server frameworks
- LNS based software tools and plug-ins
- LNS based regression test tools

SafeSquare GmbH
www.safesquare.eu



For more information

SafeSquare GmbH
Martin Mentzel
Am Graben 2-6
Radevormwald 42477
Germany
Tel: +49 (0) 2191 568142-0
Fax: +49 (0) 2191 568142-99
martin.mentzel@safesquare.eu
Web: www.safesquare.com



We
don't make
the products you see*

We make them part of the IoT



Find out how you can get **big data**
from existing networks.

info@echelon.com

* Over **140 million** devices around the world, in hundreds of applications, communicate using Echelon technology. A few typical examples include:

- Building Automation
- Tunnel and Outdoor Lighting Controls
- Process Controls
- Renewable Energy Systems
- Monitoring Devices
- High Speed and Light Rail Systems
- Sound Reinforcement and Masking Systems
- Secure POS Terminals
- HVAC Systems
- Factory and Agricultural Automation
- Fountain Animation
- Energy Grids
- Metering Devices

FEATURES

Accessing Data The currency of the IoT and the lifeblood of AI

by Andrew Maisel and Rich Blomseth, Echelon Corporation

IAP Overview

The Internet of Things is nothing new; industrial and commercial devices have been networked for decades. What is new, is the realization that large, existing networks of devices offer data ready for mining by today's and tomorrow's AI engines. Connected devices are historically the domain of operational technology (OT) professionals. They understand and speak things like LON, BACnet, Modbus, Zigbee, and CAN. Artificial Intelligence is the domain of information technology (IT) professionals. They speak things like MQTT, CoAP, REST, SOAP, and XML.

Today, when IT and OT need to interact, someone has to write a network and device specific translation protocol. These one-off solutions work, but because they are situation specific, they don't enable access to all the heterogeneous sources that are of interest to Big Data consumers and their AI engines.

IAP, the IoT Access Protocol™, is the solution to IT's need to access data on OT networks, and for the interconnection of OT devices.

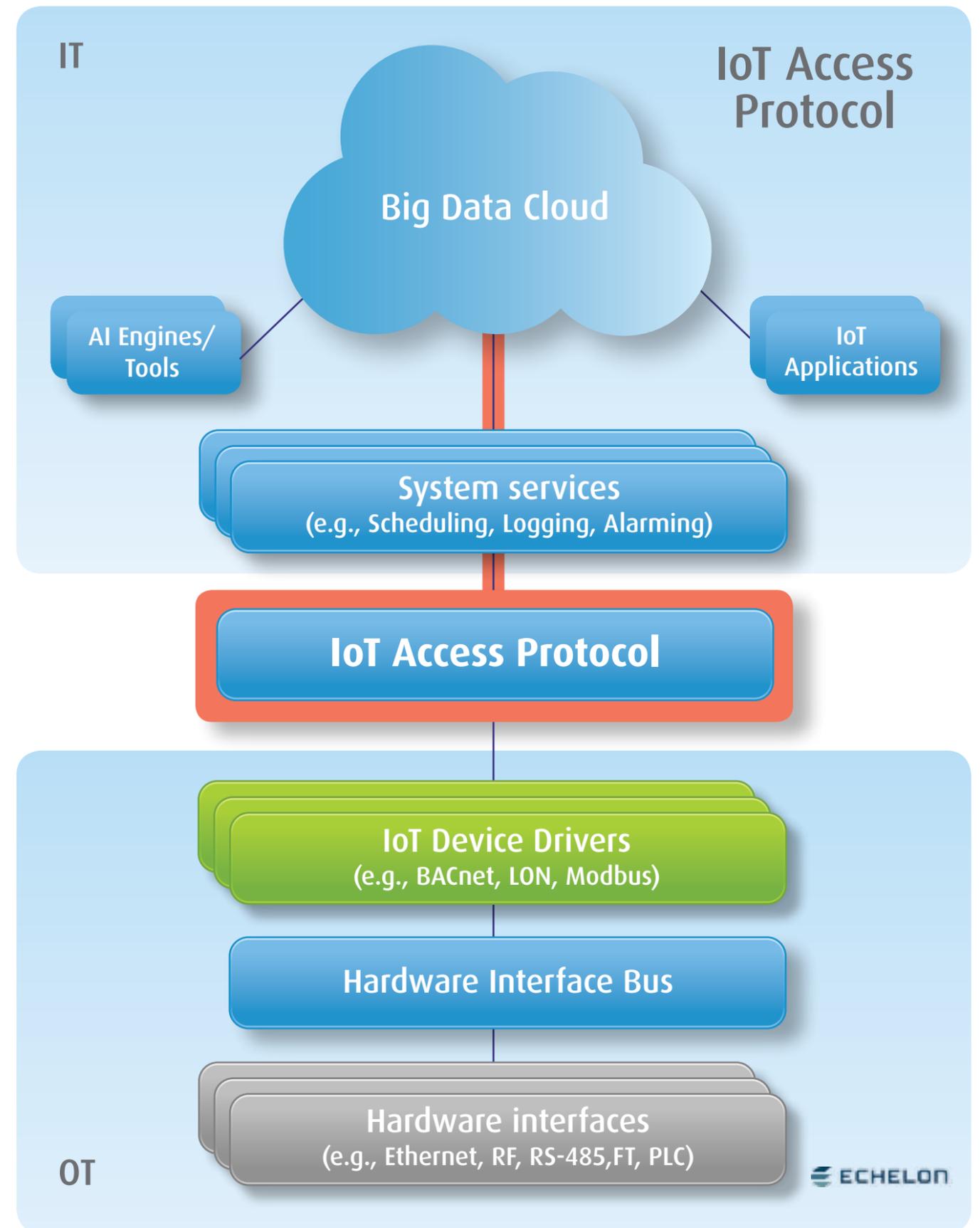
IAP Advantages

An open and extensible protocol designed for IoT Access data from new and existing device networks
Leverage the power of Big Data and AI
Easily extend to include other:

- Hardware interfaces
- Device drivers
- System services
- Cloud destinations
- Cloud services
- Or even private enterprise instances

IAP and LonMark

LonMark International has formed a Web Services Task Group to develop a new standard for IoT web services. Echelon has offered to submit the IAP definition as the basis for the new IoT web services standard, and has agreed to lead the Web Services Task Group to draft the new standard and start the standardization process. Any member of LonMark International can participate in the Web Services Task Group discussions. To participate in the task group, contact tech@lonmark.org.





New Stretch of Polish Motorway Receives Modern Smart Lighting Control System with LonMark Technology

The challenge: to design and connect the streetlighting of the "Sośnica" junction, and sections of the A1 motorway from Maciejów (without junction) to Pyrzowice (with junction) to the lighting control system located on the A1 Motorway Maintenance at the Gliwice East. The Sosnica junction is another stage of lighting modernization realized for GDDKiA an investor for National Roads and Motors in Katowice. It is the largest transport hub in Poland, where there are nearly three thousand lighting points.

Apanet Green Systems, a Polish company focused on the design and sales of power consumption reduction systems for various applications, was tasked to provide a control system for the A1 motorway for Sosnica, that needed to seamlessly integrate with an already existing system, that was implemented in 2015-2016.

Requirements

This new phase needed to incorporate the following requirements:

- An open system
- 2998 lighting points – integration into control system
- System configuration (connection newly designed devices)
- Extended software license
- Construction of additional weather stations and integration with existing stations
- Design and implementation of traffic measurement stations to the system

The Best Option

APANET's GLC 100 series controllers are certified by LonMark, ensuring they are compatible with a large number of similar systems. The system built on the LonWorks networking platform was the best option to meet the requirements of the new phase because of the following reasons:

- Open and interoperable standard, accommodates ISO/IEC 13201
- Reliability of the components and the entire system to ensure the safety of drivers
- Free choice of vendors and manufacturers of products, choice of integrators, choice of service contractors
- Energy consumption and CO2 emission reductions.

The Solution:

The solution: to create the Smart Lighting Control System, APANET installed its Green Light Controllers (GLC), connected with 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.

This time the project implemented for GDDKiA includes additional elements of the lighting control system: weather stations that measure precipitation and traffic measurement stations

- adapted for real-time measurement and recording of motion parameters. The stations' measurement data is sent to the control system, that adjusts automatically the appropriate level of lighting, which brings a drop in energy consumption. Luminaires use more power when there is a real need - traffic increase or bad weather conditions and reduces costs while keeping drivers safe.

The system allows:

- Modern lighting management system
- Integrating the next segment of A1 motorway into the control and monitoring system
- Improved maintenance
- Lower cost by reducing energy consumption
- Allows for adjustment to the lighting levels to the prevailing conditions (traffic, weather)

The Results:

The results: the lighting control system implemented for the Highway Maintenance Section in Maciejow allows more efficient control of the road lighting. The system reduces energy consumption and CO2 emission and information collected by the system improves the service planning process.

Applied solutions from Apanet cooperates with weather stations and real-time traffic measurement stations, which allows to more precisely adjust the required safe level of illumination.

Used devices work based on open communication protocols, which guarantees us freedom in choice of control system equipment's supplier. National roads, expressways and highways managed by GDNR&M are built, extended and rebuilt in stages, so the openness is an important feature.

Contact

APANET Green System Sp. z o.o.
al. Piastow 27, 52-424 Wrocław,
Poland

Andrzej Lis
andrzej.lis@greensys.pl
+48 71 783 29 30
+48 71 783 29 31
biuro@greensys.pl
www.greensys.pl

FEATURES

‘While LON is certainly not perfect, it still provides the greatest degree of efficiency, flexibility and independence of all available options’



by Jörg Schneck,
Chair LonMark Smart City Council
General Manager Sales & Marketing
Vossloh-Schwabe Deutschland GmbH

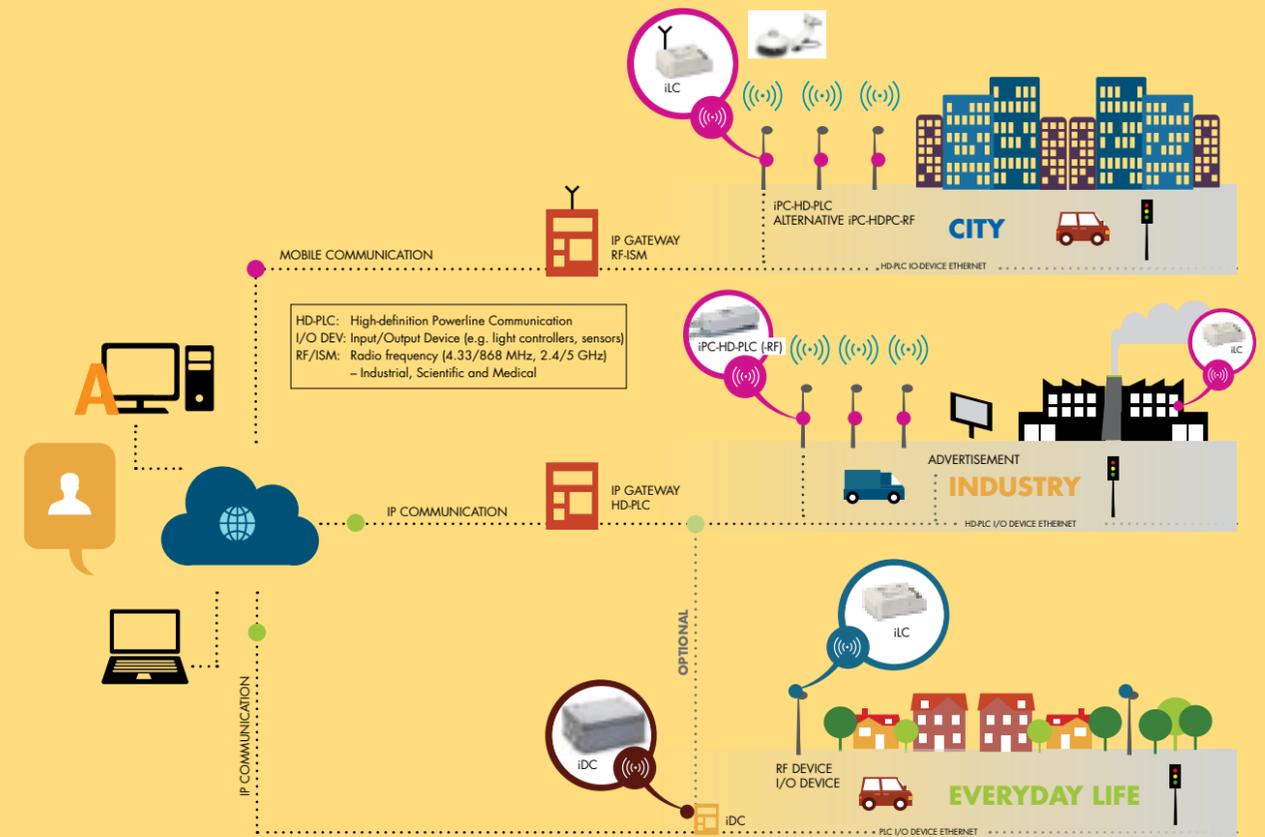
It's been 20 years since the launch of LonWorks® technology which popularized an integration approach into the field of building automation. At first, this new idea of not installing individual, vertically networked systems and initially coupling these via relays or at control system level was met with resistance. However, with the introduction of LON®-based interoperability and interconnectivity across the board, every device in the field had access to a data point, which made it possible to create visualizations on the basis of the various

trades. It is easy to remember the resistance by large suppliers that saw their market-dominating position at risk because small companies were suddenly capable of using simple assembly techniques to automate major trades. Today we are on the brink of a renaissance for this technology as system installation companies and their operators having tried out new technology streams concluded that while LON is certainly not perfect, it still provides the greatest degree of efficiency, flexibility and independence of all available options.

A year ago in response to the new trend for control technology designed for use in outdoor environments, a name change from OLLC – Outdoor Lighting LonMark® Committee – to Smart City Council (SCC) took place. In a manner similar to developments in the field of building automation, in which a strict separation of the various trades predominated for the longest time, parallels can now be identified.

An integrated approach

Today, buzzwords like Smart City and >



Future Intelligent Light Management System

The regularly spaced infrastructure of street lighting provides prime conditions for not only powerline communication (PLC) and high-speed PLC (HD-PLC), but also wireless communication options.

Featuring a high-definition powerline (HD-PLC) with speeds of up to 240 MBit IP and 2.5 MBit LON, the new generation of VS light controllers offers an efficient backbone alternative.

In addition, the up to 100 KBit, wireless and master-free mesh technology, which is also brand new, is capable of interconnecting thousands of devices within a network.

Work is currently underway to prepare standards EN 14908.7 and .8 for the two new technologies.

Application fields:

- Street & industrial lighting
- Traffic cameras
- Electro-mobility (charging at street lights)
- Parking sensors for vacant parking spaces
- Displays for bus stops (timetable)
- Waste management (for cities / private)



> IoT indicate that every conceivable application and/or product features an IP address, making it cloud-/internet-capable, interconnectable and thus remotely addressable. “But does that make sense?” is a question that comes to mind. Has the value added by remote diagnosis and control options already been maximized or is there still room for more to be achieved if an integrated approach were applied to the field. If the notion of generating added value on the basis of data points, as found in the field of building automation, is thrown into the mix, a city even if not immediately will benefit from the value of interconnectivity to a much greater degree than is currently conceivable.

The regularly spaced infrastructure of street lighting provides prime conditions for not only PLC and high-speed PLC, but also wireless communication options.

The standardization of data

It is important for a protocol to be routable, like the IP protocol is, which means being able to be converted to a different medium without requiring a conversion of the protocol itself, which would

enable products to be interconnected in both a wireless and wire-based manner. The standardization of data destined for transfer mechanisms similar to device profiles plays an important role like being able to go online anywhere using a notebook, tablet or smartphone. Does anyone believe that the success of this latter-day advancement in technology would have come about if gaining internet access had remained solely in the domain of tech-savvy geeks? Thanks to innovators like Steve Jobs, Bill Gates and ongoing competition, this level of progress has been achieved.

Of course, LTE-NB and IoT can certainly be used to make products cloud-capable, but they don't support broadcast, groupcast, or peer-to-peer; data can't be transferred directly in the field. Anything that needs to be distributed must go via the provider and thus causes much greater problems than one might suspect. Dependence on the provider, the changing time delay, called latency, depending on the kind of use and a distinct lack of an open tool base capable of integrating all trades should all provide impetus to take a fresh approach when dealing with LON.

The efforts of the community

In the past, LON was neither wireless-capable, nor did a high-speed powerline communication option exist that could be used to interconnect IPs (e.g. to transfer media content) and controllers. However, the efforts of the community to remedy these shortcomings will come to an end after Light+Building 2018!

It will then be solely down to the providers themselves to take up the topic, from the aspect of both product development and marketing strategy, and use it to generate added value in a manner similar to that achieved in the field of building automation. And this should prove to be substantially easier since, no comparable technology exists today that comes with such potential and it would no doubt take a long time to develop anything that could outperform and be more tried-and-tested than the technology behind the LON name.

I at least would wish for a smart city that provides value through holistic integration and offers a degree of convenience found today in the field of building automation.



HD-PLC for IoT

HD-PLC is an IEEE 1901 compliant Power Line Communication technology

HD-PLC TEST HOUSE

Connecting & Collaborating

Guaranteed interoperability among all HD-PLC products!



Offers
 Interoperability testing
 Certification HD-PLC logo benchmark testing
 Verification testing in real home environment

HD-PLC Alliance Members

HD-PLC Alliance

http://www.hd-plc.org

Wireless LON[®] through w2lon



by *Timo Hackbarth*,
Managing Partner who Ingenieurgesellschaft mbH

W2lon is an RF module for the LonTalk[®] communication protocol that wirelessly connects wired LON networks on one side and any kind of LON-based actuators and sensors in the automation environment on the other side. The performant transceiver integrates seamlessly and completely into the LON protocol according to ISO/IEC 14908. Thus, an established high-tech infrastructure is immediately available – from interoperable network management tools to the connection of a wide range of SCADA systems. As all existing LON-based products can be integrated as well, all the systems being employed so far continue to be usable. The system management and administration can be performed using existing software management systems. All this provides a perfect basis for hassle-free system designs and retrofits.

Meshed network solution

The RF communication is based on an extremely performant, highly scalable and very robust meshed network. The benefit of the meshed-network solution is plain to see: the system works regardless of the functioning of the individual nodes and is

With its latest innovation, the who Ingenieurgesellschaft mbH, a specialist in automation and communication technologies based in the northern German city of Lübeck, is opening up a whole new perspective on the development of Smart City applications as well as of building and industrial automation solutions. The name “w2lon” already hints at the technical background of the new development: the wireless LON network communication.

thus constantly available and highly reliable. As an illustration, in a single street-lighting network up to 1000 street lights can be operated. If a light or another network point fails, the data packet takes an alternate route via another network point to its destination.

The broadcast addressing possibility allows for very fast response times. Turning on up to 1000 street lights belonging to the same network, for example, would take less than 5 minutes, response included. The RF range between the network points is currently 50 m to 150 m. The transportation channel is located in the 868 MHz frequency band. The extension to the 2.4 MHz band is already in the planning stages.

Through w2lon, actuators and sensors can be decidedly programmed so that e.g. the street lights will brighten when a person or a vehicle approaches and dim as soon as no activity is detected anymore. Consequently, the full luminance and hence energy is used only when really needed. And there are multitudes of further conceivable conditions that could be applied in the future such as weatherspe-

cific conditions, dependencies on daytimes or seasons, or traffic management factors.

Interfaces to IoT integrated

Since all required interfaces to the Internet of Things are already integrated, w2lon not only allows for a new generation of street lighting systems but affords a virtually unlimited potential for individual solutions in designing Smart Cities. Possible future use cases for the RF module are, for instance, parking space management systems, traffic-flow surveillance, or level monitoring of e.g. garbage containers.

However, Smart City is only one of the numerous application fields for w2lon. With the development of this innovative RF channel that expands the LON technology by a robust and flexible element the who Ingenieurgesellschaft mbH delivers a future-proof wireless solution that facilitates to optimally cope with innovative development tasks throughout the entire LON-based building and industrial automation markets. System developers are now provided with the option of connecting LON networks wirelessly through a performant interface so that they can set about automation projects in industrial



environments or building retrofits which, so far, could not have been tackled due to a lack of available cable systems. As a development partner, who Ingenieurgesellschaft mbH is ready to take over the design-in.

Test projects

w2lon is expected to be launched to the market in the 1st quarter of 2018.

Currently, plans are under way to open 2 test projects for demonstration purposes in Lübeck and Frankfurt am Main, Germany, where street lights with integrated w2lon modules will be operated. The appropriate negotiations with the operators are in progress.

Visit the who Ingenieurgesellschaft mbH stand at the Light+Building fair from 18 to

23 March 2018 at Hall 5, Booth D29, and get detailed information about w2lon. The company will officially present the LON RF transceiver and will be pleased to answer any questions about the product. Additional information about the who Ingenieurgesellschaft mbH you will find under who-ing.de.



who Ingenieurgesellschaft mbH

Your development partner for customized solutions



Building Automation



Industrial Automation



Medical Technology

 Schwertfegerstr. 27
23556 Lübeck, Germany

 +49 (0) 451 31781-000
 +49 (0) 451 31781-399

 info@who-ing.de
 www.who-ing.de

Re-inventing Lighting with Intelligent Mesh Network

by *Youssef Kamel*,
General Manager – Wirepas Americas

Lighting is one of the most basic human needs with an estimated 12 billion end points in streets, offices, factories, retail locations around the world. Connectivity solutions for intelligent lighting must provide a total cost of ownership and ease of deployment in keeping with the large and rapidly growing number of endpoints in the smart lighting network. Other critical requirements include high reliability, low energy consumption and low latency.

Connected outdoor lighting provides a platform to mount sensors and actuators that can provide additional value such as by monitoring traffic to optimize traffic light timing, tracking utilization of parking spaces, monitoring the street with security cameras and over-lighting the scene of a public safety incident.

Demanding a cost-effective solution

Intelligent indoor lighting systems are expected to form the nervous systems of the smart, connected buildings of the future. For example, smart lights may respond to data from wearable devices to help perk up your mood, de-stress you or help you concentrate on the task at hand. Beacons ride along on smart lighting to transmit and receive messages to and from smartphones to communicate with people indoors. Achieving these and the many other potential benefits of smart lighting requires that millions of lighting devices be connected to the IoT which in turn presents

some major challenges. The vast number of lights that needs to be connected demands a cost-effective solution. The costs that must be considered include not just the cost of the modules connecting each light but also the complete networking infrastructure required to connect each endpoint to the Internet, including network design hardware and installation costs. It's also important to consider recurring costs. Lighting must often change to adapt to evolving requirements so the cost of adding new nodes plays a key role in the total cost of ownership.

Reliability is another important challenge in lighting applications. The radio environment frequently changes due to factors such as temperature, buildings and other obstacles, and atmospheric conditions. The walls of the building provide additional obstacles that must be overcome

when connecting indoor lighting. Energy consumption is a major concern in most of lighting applications where the connectivity module needs to be powered either by a battery or by energy harvesting. Latency is important in applications where lighting is controlled by a person that expects an immediate response.

An innovative approach to lighting connectivity

Wirepas Connectivity for Lighting is a wireless connectivity product optimized for indoor and outdoor lighting. It is an automated multi-hop mesh network that enables each lighting node to communicate with its neighbor, passing data from device to device until it is finally delivered to a gateway. Each node can send data to multiple devices and to multiple gateways and is itself a possible routing point for any other node. The network automati-

cally balances loads among the gateways and if radio transmissions conditions deteriorate, the network automatically reconfigures itself so that data is sent via routes that bypass the troublesome area.

The individual nodes interact with each other to determine the optimal transmission pathway for each node, eliminating the need for a central network control system. The network nodes co-operatively select the times and channels used for communications, while using all of the available channels in a given band. The devices determine the channels and exact time to communicate with each other in advance, eliminating overhead such as overhearing, idle listening and intra-network collisions. The connectivity protocol can be configured to optimize the tradeoffs between bandwidth, latency, range and power consumption based on



> operating parameters that can be changed by network administrators.

This approach provides a major reduction in networking infrastructure, design and installation costs compared to conventional networking designs. The new connectivity option also has the advantage of being able to work with any physical layer. Using an open standard radio module instead of a proprietary module often provides a substantial reduction in hardware expenses.

Conclusion

Smart, connected lighting provides energy and maintenance savings while increasing the quality of light provided to users. At the same time the smart lighting infrastructure can extend the IoT to deliver a wide range of applications such as environmental sensing, advertising and indoor

position locating. The new Wirepas Connectivity for Lighting product substantially reduces total cost of ownership for smart lighting applications. The new wireless networking platform can also improve network reliability, reduce energy consumption and reduce latency. As a result, Wirepas Connectivity for Lighting provides the ideal solution for connecting outdoor and indoor lighting to the IoT at the lowest possible cost while delivering high levels of performance.

Youssef Kamel, General Manager – Wirepas Americas
(modified from the original article in American Infrastructure Magazine)

More information at www.wirepas.com



A System Integrator Profile: Western Allied

NEWS

by *Ron Bernstein*,
CEO and Executive Director, LonMark International



Alan Slabodkin,
Western Allied

I recently had the opportunity to chat with Alan Slabodkin, Vice President at Western Allied, about their use of LON and their impressive reputation in the Southern California market. Alan is a member of the the LonMark Board of Directors and a long-time user and promotor of open LonWorks systems. Western Allied is headquartered near Los Angeles, California, and has been installing LON systems for over two decades.

When asked about their success, Alan simply replies, “Open systems is what our customers want, and we give it to them.” According to Western Allied, delivering an open system requires an integrator and a customer to work together to ensure the customer not only “owns” their system, but that all products and devices meet the following key criteria:

- Based on ISO 14908
- Fully installable by an open LNS network management tool
- LonMark certified or follows the Lonmark guidelines for interoperability
- Available from multiple sources
- Do not have any “hooks” that make them proprietary to a sole-sourced vendor solution
- Can be managed, monitored, and controlled by any BMS front end software system
- Are fully documented and easily installed by a qualified network integrator

Open systems philosophy

This is a simple list of requirements, and is easily fulfilled with a LonMark based solution. Western Allied’s philosophy of open systems has served them well. Their client list of LON installed sites reads like a who’s who of the entertainment, medical, education, and commercial markets in the Southern California region. Their customer list includes:

Media/Entertainment

The Reserve
TMZ
Sony Play Station
Microsoft
NFL Networks
Fox TV
Universal Studios
Jimmy Kimmel
Disney
Paramount
Technicolor
DC Comics
Freemantle
CBS
M David Paul & Associates
The Worthe Group
Burbank Studios
KTLA
Netflix
Hudson Pacific
Legendary
KCET
Fox Theater
Musician’s Union
Capitol Records

Medical:

Eisenhower Medical Center
(30+ buildings)
Hollywood Presbyterian
Betty Ford
Siemens Medical
Southbay Surgeons
Skypark (7 buildings)
LA County South Health
Center

Education:

Cal State University,
Pomona
Electrical Training Institute
(IBEW)
Crossroads School
Museum of Tolerance
Mt. St. Marys
Yula
Tiger Woods Learning
Center
Woodbury
Milken Family Foundation

Manufacturing

Biorad
SpaceX
TEVA
Technicast
HRL
Ready Pac
Orange Bakery
Neutrogena
Monster Energy

Municipalities

City of Ontario
City of San Bernardino
City of Newport Beach
City of Montebello
Caltrans

Commercial Building Owners

Hudson Pacific
Continental Development
M David Paul & Associates
The Worthe Group
Douglas Emmett

What’s in the future?

So, what’s in the future for Alan and Western Allied? Looking for new IoT solutions that can leverage the existing LON infrastructure in these facilities and offer clients new multi protocol, new energy savings, maintenance and operations savings, and greater efficiencies. Some of the new IoT applications that allow WA’s service techs to diagnose and solve service problems from their smart phones and tablets helps provide better service and greater value to the customer. And they keep coming back. With a strong customer-centric philosophy of great service, competitive costs, and high reliability, Western Allied has been able to grow their customer base without much marketing. According to Alan, “Word of mouth recommendations have been the key to our success!”



Reinventing Lighting with a Wide Area Mesh Network

www.wirepas.com

NEW PRODUCT

Since five years of entering the Building Automation market with its innovative Oxtopus router, Occitaline continues the development of its "Galaxy" building infrastructure products. This past fall Occitaline launched an acquisition station, a LoRa Pico Gateway and two new programmable sensors including one using LPWAN, to connect to an Oxtopus router in order to retrieve all data from the building automation network.

Oxtopus new feature

Oxtopus features its modularity with the many combinations of different protocols, TP/FT10 - LonWorks/IP; Modbus RTU - Modbus IP; BACnet MS/TP - BACnet IP, provides customization as you please. Oxtopus LON routers now offer schedule objects to optimize the integration cost.

The **Oxtopus Modbus** has also been redesigned and enriched in its diagnostic and security features thanks to a whitelist IP address filtering, that allows only identified IP addresses to ask questions.

Finally, the IoT router for the Smart Building, the **Oxtopus IzoT™**, is now equipped with BACnet schedule objects (see Fig. 2) and notification class for BACnet alarms.

Ox-BigData : Data Acquisition for Cloud and Web Services

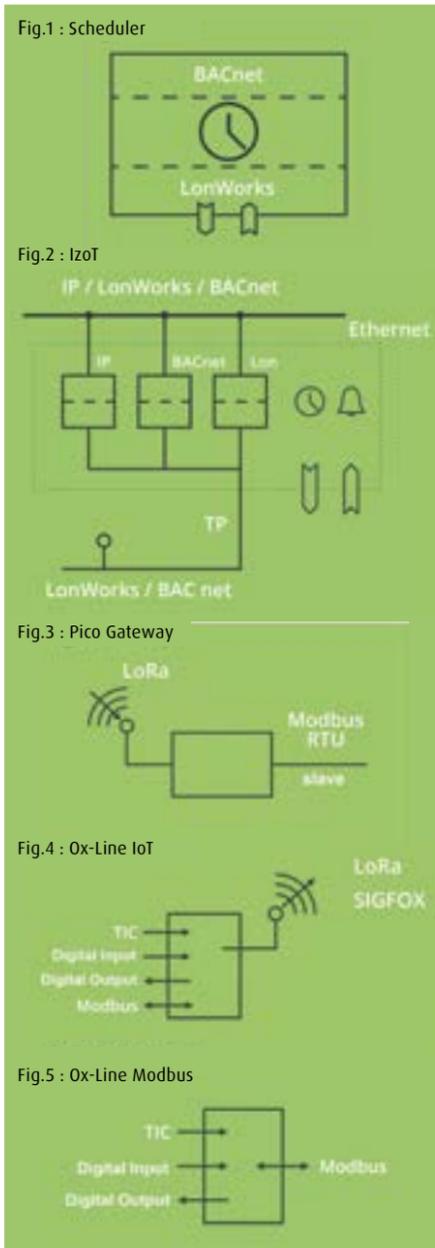
The **Ox-BigData based on Oxtopus** is a multi-protocol data acquisition station installed on the GTB's IP backbone and collects needed information to a cloud: Microsoft Azure IoT, Oracle IoT, MySQL DB and Web Services.

Ox-Base: Data Acquisition for SD card and Web Services

The recently launched **Ox-Base based on Oxtopus** is a multi-protocol router and limited data acquisition station (100 max)

Galaxy Occitaline Continues its Expansion

by Daniel Zotti, CEO, Occitaline



compared to the Ox-BigData; it offers the same functions for sending data. In addition, the Ox-Base provides data treatment, alarm management, alert by email including reports and embedded Web server for visualization onto HTML5 responsive page and data regroup by categories.

Lx-Core, Ox-Line IoT and Ox-Line Modbus

In the same way that the Ox-Core makes it possible to develop the applications specific to the functions of the Oxtopus, the **Lx-Core** is the platform that allows to develop specific applications with all inputs and outputs according to the chosen protocols (see fig. 3).

In line with this platform: the new LPWAN **Ox-Line IoT** programmable sensor, can be used as a multiple sensor. Depending on the imbedded application, it may provide the functions of transmitter or receiver. In receiver mode, it can collect the Smart Building's LoRa sensors and transmit them to the Ox-BigData or Ox-Base (see fig. 4). To complete the range, **Ox-Line Modbus**, a second programmable sensor, is equipped with the same hardware combination than the Ox-Line IoT, but only provides data in EIA -485 Modbus slave (see fig. 5).

The range of Occitaline products, both horizontally and vertically, offers a better understanding of the concept of **Galaxy Occitaline**. We can then start dreaming of the continuation, knowing that the galaxy is perhaps infinite?

Oxtopus

Ox-1IzoT-BigData : more than an IzoT™ router

The best of two worlds



Web services are available on the Ox-IzoT-BigData. You can develop your own IT applications. The Ox-IzoT is Ready2Serve for the Smart Grid, Smarty Building, and Smart City markets..

Embedded field scheduler based on native BACnet™ objects for direct access by your SCADA system. Objects are directly controlled by LonMark SNVTs on the field devices.

Alarms are as close as possible to the field devices. Alarms are triggered by the Ox-IzoT Big Data server. Internal native BACnet™ objects are subscribed to by the SCADA system and alarms are triggered by LonMark network variable updates.

OCCITALINE - 13 rue Antoine de Lavoisier - 31830 Plaisance Du Touch - FRANCE
Tél : +33 (0)5 34 28 12 24 - info@occitaline.com - www.occitaline.com



Citylone Case Study: City of Les Mureaux

The City of Les Mureaux, located in the West of Paris, has 32,000 inhabitants. With 70 kilometers of roadway, 4,300 lighting points and the scheduled creation of more than 20 hectares of supplementary public place with seven additional kilometers of roadway, the City will have to increase the number of lighting points by 1,000 while keeping a moderated energy consumption.

This project is an innovative challenge, which fits completely with the energy efficiency program launched by the City in 2009, but Les Mureaux had to reconsider the way public lighting was managed to reach this goal.

In public lighting, today's technologies can help to bring only the necessary light during the times when night usage is very

low. Moreover, public lighting is one of the highest energy consumers of the City but it needs to be there to light where and when it is necessary. Public lighting remote management allows the City to manage each lighting point as it is needed, and to see an overview of the global system, while ensuring energy savings and citizen security.

A solution that answered all requests

The City of Les Mureaux needed to find a solution that answered all its requests: save energy, security for its inhabitants, and which can be later utilized as the primary backbone of its smart city.

The solution chosen was the Citylone lighting point remote management using Power Line Communication, which allows the City of Les Mureaux management of the whole lighting system with adaptation of public lighting to meet the needs of its citizens.

As of now, and without investment in renovation of luminaries, the City has chosen the lighting point management solution to optimize lighting by:

- Lighting adjustment
- Power reduction
- Less re-lamping
- A permanent and remote control of the installations

- Automatic alarms in case of failure of functioning default
- Lighting management by type of road, type of living areas, or public space

This solution allows:

- Supervision, remote diagnosis of defaults
- Detection of lamp or ballasts failures
- Detection of power failures at each cabinet
- Creation of scenarios for power reduction
- Elaborate dashboard and alarm follow up
- Follow up of consumptions, energy savings and investment

The City has chosen the Citylone solution because this remote-controlled system can manage any kind of lamp, any kind of ballast (magnetic or electronic) and can be placed on any kind of material, regardless of the material and its age. With the large range of Citylone products, the City can now find the requested controller to fit its need.

The solution also allows a global vision of the whole system, point by point, from the operator's desk. Furthermore, the software can receive data and edit complete statistics about its public lighting.

Le Jour de la Nuit

A few months ago, the City participated in a French event called 'Le jour de la nuit' (The day of the night). Le Jour de la Nuit is an event to promote awareness to light-



ing pollution, protection of biodiversity and starry sky. To participate, the City of Les Mureaux decided to switch off public lighting during one night.

Citylone controllers installed in each luminary helped the City to realize this very easily. In a few clicks, the controllers powered off the lights, only on the chosen day. This operation was a completed success, which shows City engagement for environment protection.

But if Citylone solution is managing public lighting, it also goes further to help the City in many other areas. With the solution chosen by the City of Les Mureaux, the network can remain powered 24 hours a day and proposes an electrical network available on all the City for other uses. Thus, the City has decided that any kind of material requesting energy powering installed on the public area can be connected on this network. For example, the City has connected: information terminals for transport users, urban video cameras, educational speed cameras, car sharing information panels, scrolling advertising panels, signs allowing parking management, and orientation of drivers to available parking places. This electrical and communication network availability saves a lot of engineering work, and thus a lot of money.

Sensors for parking

Furthermore, the City has high tech sensors for parking in the City center. These sensors create a communication network which send wireless information to data collector, placed in relay locations, and are powered electrically by the public lighting system. These sensors send information of occupation to the parking management system which communicates information to the information display panels placed in the City, also powered by the public lighting network.

The City has just finished equipping 2,300 lighting points with SL42-FD-1T-M-T controllers (for magnetic ballasts) and SL21-E-M-T controllers (for electronic ballasts). This system allows moderation of energy consumption as today for 4,300 lighting points, the energy consumption is the same as before with 3,900 lighting points. Other key benefits include:

Adjustment of lighting of the roads according to frequentation

- Security of the citizen by detection of failures
- Energy savings (reduction of 46% of power at cabinet)
- Savings on re-lamping
- Remote management
- Failure detection also during the day to save night tours
- Quick switch off from the computer in case of problem in the City
- Real time control of chosen luminaries during events
- Creation of an electrical network anywhere in the City to power any kind of material.

The City now has a new French company partner in Citylone, one that is fully committed and engaged as a team to provide robust solutions and ensure company and customer success.

<http://www.citylone.com/>

For more information about this project, contact:

Citylone
Catherine Rambaud
catherine.rambaud@groupe-arcom.com
Tel: +33 4 78 45 65 65
ZA des Andr s
17 Rue du Pr  Magne
Brindas 69126
France

NEW PRODUCT

LonMark® Adopts New High-Speed Communication Standard for Smart Cities



by Matthias Lürkens,
General Manager, Gesytec

Modern smart city and smart building applications demand higher bandwidths than available from the original LonWorks® channels. LonMark has chosen LON HD-PLC to deliver a new high-speed communication channel capable of meeting the demands of networks today and tomorrow. Multiple LonMark members are working on compatible devices and support international standardization (EN 14908-8 or ANSI/CTA-709.8).

Building Smarter Control Networks

Smarter systems are built on a bedrock of data. In modern smart cities and buildings, you'll find tens of thousands of sensors capturing inputs about carbon dioxide, temperature, lighting, occupancy, safety and security, energy use, and more. Control networks are getting larger and more complex. They're also becoming more integrated, as systems converge and operators dig deeper into data for new insights and efficiencies.

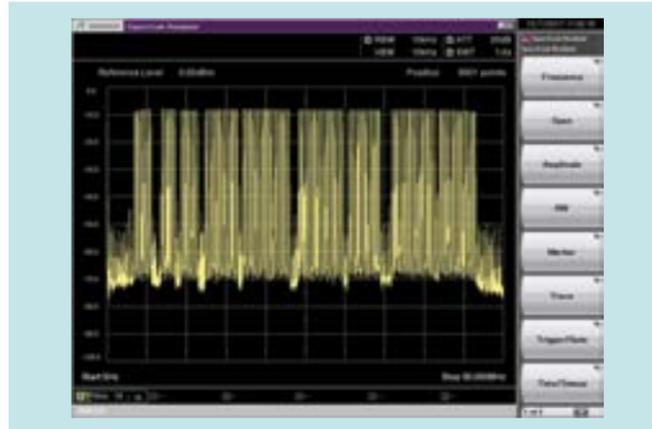
Yet, the underlying LonWorks communications channels have changed very little since they were originally developed in 1988 by Echelon Corporation. Developers today increasingly struggle to meet the bandwidth demands of new applications with the low bit rates available over twisted-pair (78kbps) and powerline (5.4kbps). In practice, this means that powerline has become obsolete in all but the simplest control networks. In its place, system integrators have deployed millions of miles of twisted-pair, along with a vast network of costly switches, routers, and repeaters to deliver the throughput demanded by their applications.

The New Standard for Wireline Communications

LonMark recently addressed these concerns by adopting LON HD-PLC as a new channel for high-speed, highly secure, multi-node, mesh networking. The LON HD-PLC PHY/MAC is an international standard based on IEEE 1901. Routing is provided by a CMSR (Centralized Metric-based Source Routing) technique based on ITU-T G.9905, enabling the development of highly efficient self-healing mesh networks with repeating functionality (multi-hop). Supporting up to 1024 nodes on a single network, LON HD-PLC enables system integrators to quickly deploy large systems without time-consuming network planning or costly devices like switches and routers. It is truly a plug-and-play system at every point.

Offering all the benefits of a free topology network, LON HD-PLC is ideal for large industrial projects. It uses a wavelet-based OFDM (Orthogonal Frequency Division Multiplexing) modulation tech-

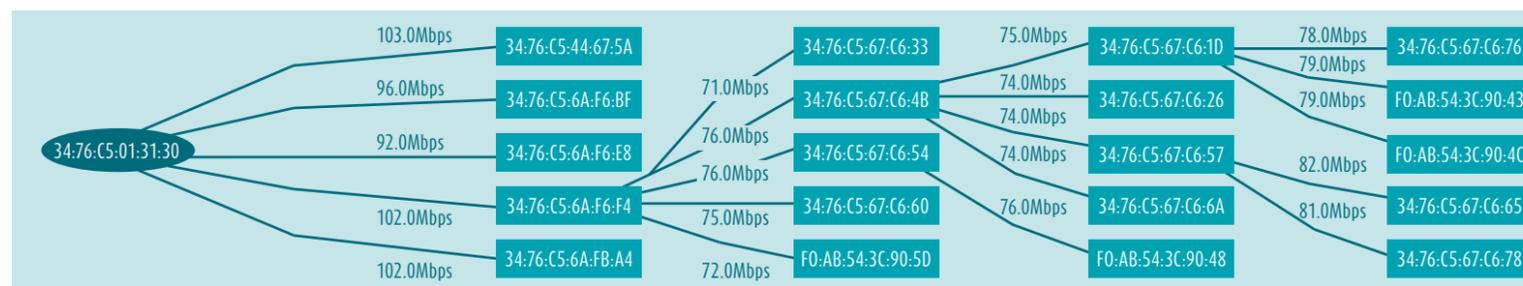
nique, with advanced forward error correction schemes to deliver high data rates (up to 240Mbps) and excellent robustness.



LON HD-PLC provides the bandwidth and countermeasures needed to address growing cybersecurity concerns. Crypto-strong AES-128 encryption, together with black- and whitelisting of devices, reduces the risk of behind-the-firewall attacks. Additionally, the use of IPv6 addressing enables the addition of the state-of-the-art security features through simple firmware updates.

Because the protocol implements an Ethernet-like transmission, LON HD-PLC devices can act as an Ethernet gateway in parallel, enabling double use as gateways for IP cameras, Wi-Fi hotspots, or any other IP-based solution. This flexibility reduces both the cost and complexity of system integration, making LON HD-PLC ideal for the converged networks that typify today's smart cities and buildings.

Maintenance and management tools are already existent to figure out network topology and transmission details. All LON HD-PLC devices are can be SW updated.



PHY speed	240 Mbps
Max. number of nodes	1,024
Max. number of hops	10
Throughput (without hopping)	90 Mbps
Throughput (multi-hop)	10 Mbps
Latency	20 ms
Message throughput	200 p/s
Encryption	AES128
Security	Black- and whitelisting of devices
Physical layers supported	Power line, twisted pair, COAX, Ethernet cabling and others

Key features of LON HD-PLC.

Two Architectural Approaches to Developing LON HD-PLC Systems

LON HD-PLC technology is available from multiple suppliers, including Panasonic, MegaChips, RoHM, Xingtera, and others. Companies such as Who Ingenieuresellschaft mbH, Vossloh Schwabe, Gesytec, and Occitaline are also working on devices and teaming up in the LonMark Channel Standardization Committee (LCSC). Pilots are running now, and the standards are expected to be finished in 2018. All LonMark members are welcome to participate in the LCSC.

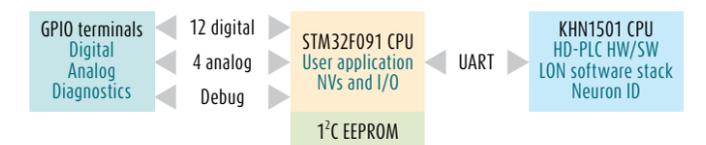
LON HD-PLC SoC for New Designs

System designers who want to achieve the highest speed and space savings in new designs should consider MegaChips LON HD-PLC SoC (KHN1501). This device includes the baseband, PHY, MAC, memory, and a fully integrated AFE in a single compact package capable of delivering data rates above 90Mbps (point-to-point connection on powerlines). It also supports other wireline technologies, like coax and twisted-pair, giving system designers a very versatile solution.

At the heart of the MegaChips SoC is a 32-bit ARM CPU running Gesytec's EasyLON Protocol Stack (EPOS). The EPOS LON stack from Gesytec is designed to run in bare metal environments, specifically single-chip MCUs without an operating system. Developed over a decade ago, EasyLON is now running on tens of thousands of devices. It is fully compatible with LonWorks, giving developers a cost-effective, easy-to-use alternative to Echelon's proprietary protocol stack.



The KHN1501 is connected by a UART to an ARM Cortex-M0 CPU, which is used to run the end user's application and remotely control the EPOS LON stack on the KHN1501. Using a small, inexpensive Cortex M0 gives engineers the flexibility to choose the right chips for their peripheral needs. Separating the LON stack from the application CPU offers two primary advantages: it improves the reliability of the solution and simplifies the use of LON in a standard ANSI-C environment.



Running a "XIF-Generator" generates the LON interface definition and a C-framework, where the user can drop in his peripheral-specific code. Additionally, using the "XIF-Generator" allows porting an existing Neuron-based device into the world of silicon-supplier-independent hardware. MegaChips and Gesytec have collaborated on standardization to ensure that all solutions are perfectly interoperable.

Beginning in January 2018, Gesytec and MegaChips will release a hardware and software development kit. It comes with a combination of a MegaChips KHN1501 and an ST STM32F90x microcontroller, with various digital, analog, and serial protocol options, and Gesytec's EasyLON protocol stack. Furthermore, Gesytec

> will market this design as a module for low- and mid-volume products. The design can also be licensed as a turnkey solution for future products.

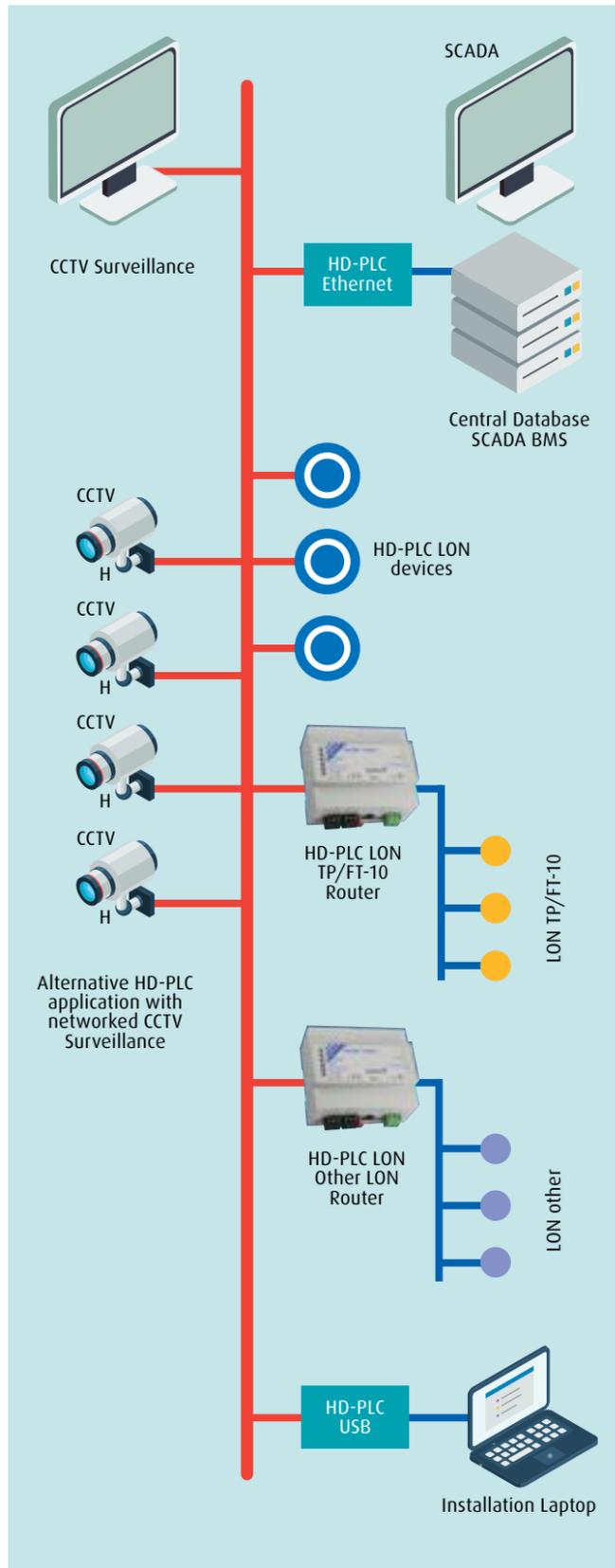


LON HD-PLC Transceiver for Legacy Designs

System designers who want to upgrade to megabit data rates using their existing Neuron-based design should consider the LON HD-PLC transceiver developed by who Ingenieurgesellschaft mbH. This transceiver is designed to be paired with a standard Neuron chip using existing source code for LON HD-PLC. A 2.5Mbps direct-connected mode is provided to connect the LON HD-PLC transceiver to the Neuron processor. This dramatically increases bandwidth, as has been demonstrated in pilot installations for street light applications today.

Looking Towards a Smarter Future

As more sensors and systems are integrated throughout the built environment, system integrators will need to adopt communications technologies capable of delivering the bandwidth and security demanded by today's smart cities and buildings. LonMark's adoption of LON HD-PLC for high-speed, multi-node networks provides a clear path to a smarter future. LonMark members have demonstrated their commitment to this vision by defining new international standards and developing a new generation of LON HD-PLC-based products in a little less than 15 months. Even more solutions are on their way, giving designers of smart city and building applications plenty to look forward to.



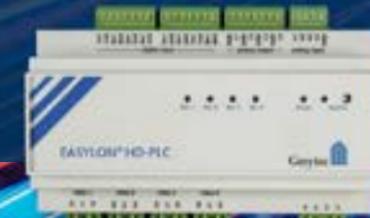
EASYLON ROUTER PLUS

- Multilingual user interface
- Remote network interface
- Easiest installation
- Pinpoint diagnostics
- Rapid backup, restore and update
- Brand labeling



HD-PLC LON

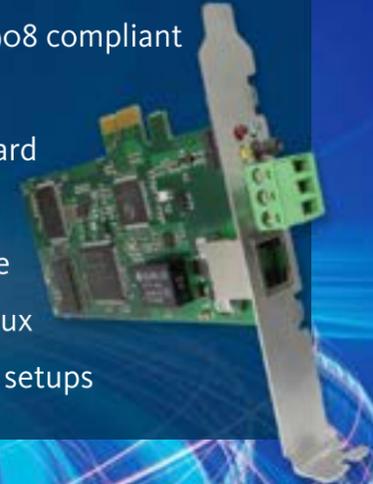
- Fastest powerline ever
- More than 10 Mbit/s
- IEEE 1901 and pre ISO/IEC 14908-8
- Evaluation kit
- Plug in modules
- OEM design and production



EASYLON

INTERFACES PLUS

- Fully ISO/IEC 14908 compliant
- USB, PCI Express including Mini Card
- VNI and MIP
- Best performance
- Windows and Linux
- OEM drivers and setups



LON OEM

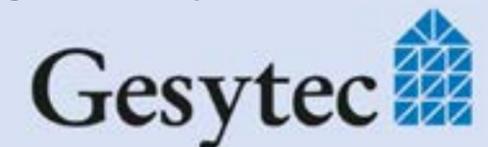
- Industrial and building automation
- Plug in LON interfaces
- RS232, USB and others
- Replacement solutions
- Design from scratch
- Rock solid industrial design



Gesytec is LON pioneer since 1992. Since more than 10 years, ten thousands of EasyLON devices are running 24/7, based on Gesytec's LON software stack and own transceiver hardware solutions.

- Many years of cooperation
- Satisfied customers
- Latest technologies
- Reliable support
- Long availability

www.gesytec.de





THINK FASTER. THINK MEGACHIPS.

Upgrade your LON network with faster, more secure communications.

Megabit data rates. IP mesh networking with multi-hop. Crypto-strong encryption. There are a lot of reasons why LonMark chose HD-PLC as the new standard for wireline communications.

And now so can you. With MegaChips's single-chip HD-PLC solution (MLKHN1501), it's easy for you to upgrade to blazing-fast speeds—and faster deployments—using existing powerlines, twisted-pair, and coax. Offering more security, longer transmission distances, support for more nodes, and unparalleled robustness, it's the best decision you can make for smart city and smart building applications.

Learn more at:

megachips.com/HD-PLC



MegaChips