LOYTEC Express

Magazine for Building Automation

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Innovative DALI Lighting System
for Manchester Airport

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Troubleshooting in BACnet
Networks

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Building Automation -
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L-VIS Touch Panels

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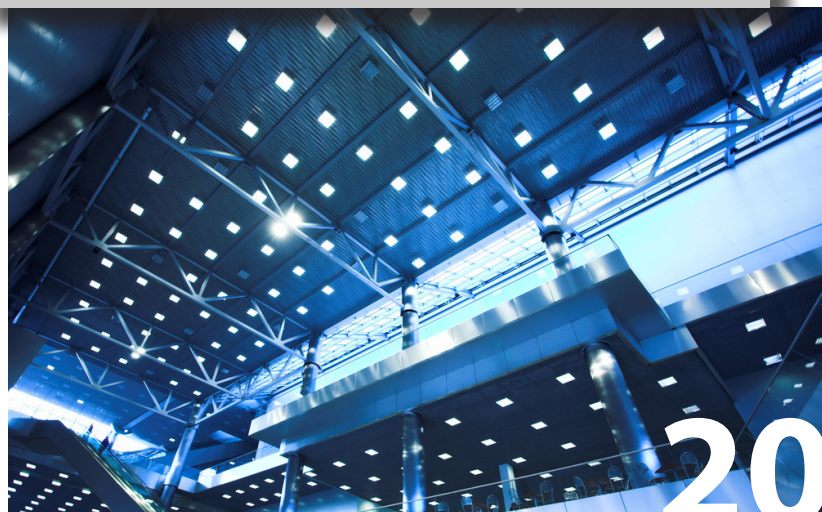
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In order to improve ourselves continuously …

Striving after society's necessity for constant improvement, ISO 9001 was "invented" decades ago. Quality management became an obligation and the permanent improvement of procedures and processes with an accompanying documentation, traceable at any time, became ingrained.

Continuous improvement is also the focus of energy management according to ISO 50001. Following the same principle as ISO 9001 – PDCA (Plan, Do, Check, Act) – an energy management system implements a procedure for the adherence and evaluation of energy relevant regulations. Besides statutory provisions, this also encompasses other requirements, e.g. customer specifications, corporate principles, or internal guidelines. Besides regulations, for example in the areas "generating and distributing energy" or "for operating specific consumers of energy", the regulations for "energy efficiency of buildings, facilities, and devices" are the main point of interest for our industry.

Hans-Jörg Schweinzer, CEO
LOYTEC electronics GmbH

In the future, more and more data will be collected through measurement. After all, we need to know where the energy is used in order to take energy-saving measures. Data bases will get "thick cheeks" as they have to struggle with more data than ever before – "Big Data" is the new buzzword.

More and more, building management systems will take over the tasks of data collection, analysis, and evaluation, and thus become an essential element of an energy management system. Consequently, the requirements for building management systems are changing rapidly. Yesterday, servers were housed in the building itself, today they are wisely positioned in data centers as part of the IT. Thus, the collected data is safe (regular server maintenance, backup, etc.) and apart from the building management system, other systems can access the data – via secured connections, of course.

Following these requirements, we developed the system architecture of our LWEB-900 building management system at LOYTEC. The LWEB-900 server is "cloud ready" and communicates via secured connections with the LOYTEC devices inside buildings and facilities as well as LWEB-900 clients. The integrated reporting feature automatically creates energy reports and sends them to the responsible persons. Thereby, the tasks of energy management are entirely managed by LWEB-900.

As a bonus for the BACnet community, the new LWEB-900 Release features all functions of a BACnet Operating Workstation. Find out more in this issue of L-Express!

Cover Story

L-VIS celebrates its 10th birthday and is "louder" than ever before!
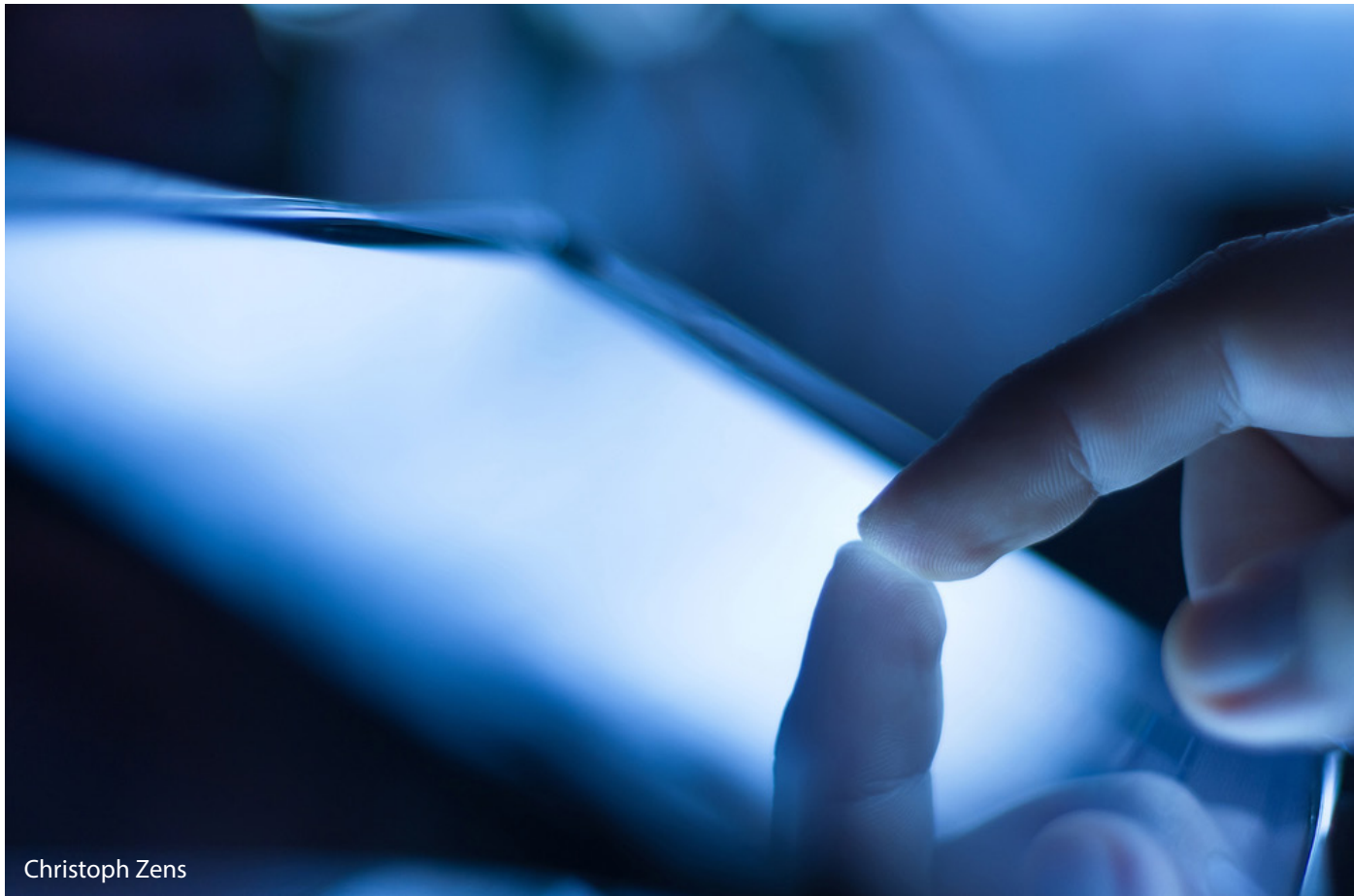
Christoph Zens

For more than 10 years, LOYTEC has been providing the L-VIS ["elvis"] family of devices for visualization and operation of building automation systems. The L-VIS family has become an important part of the LOYTEC product portfolio. Consequently, it is continuously developed and enhanced with new devices and functions. The first "jog dial L-VIS" device that was invented 10 years ago has developed into a multifunctional panel with modern design that comes with a frameless glass surface and capacitive touch.

2004: The first L-VIS model

The first model – the jog dial L-VIS

In March 2004, LOYTEC launched the first model of the L-VIS product family. Designed as a device for data visualization in a LON network, the LVIS-3ECTR consisted of a monochrome LCD display in an aluminum frame. The central control element was a jog dial (hence the name jog dial L-VIS), which allowed the user to dial through the information (controls) provided on the display and choose elements for entering data. The device could be connected to both common LonMark TP/FT-10 and LonMark IP-852 channels. The jog dial L-VIS was one of the most powerful LON devices of its time and also the first panel that could be operated in an IP-852 (LON/IP) channel.

Touch instead of jog dial

The jog dial L-VIS has already been replaced by the first L-VIS generation with color LCD and touch sensor in

December 2005. The LCD display was increased to 5.7", resolution was raised from 240 x 128 to 320 x 240 pixels, and graphical representation was upgraded to the 256 VGA color palette. The timeless design of the aluminum frame that is flush with the wall because of an in-wall-mounted installation was maintained. That's why L-VIS is well-suited for room but also system operation. In parallel, device firmware and programming software have been further developed and also new controls implemented, which became feasible because of the devices' new capabilities. The LVIS-3E100 devices are still sold and used in new plants in the same form factor but with latest technology. Of course, the latest version of the continuously improved software is also still available for these devices.

L-VIS for BACnet

In October 2006, the first BACnet L-VIS followed. The LVIS-ME200 is identical in construction to the LVIS-3E100, but features an RS-485 port to connect to BACnet MS/TP networks, which replaces the TP/FT port of the LVIS-3E100. Also, the integration in a BACnet/IP network was supported from the start. It provides connectivity to a control center and efficient communication with powerful BACnet/IP devices in the field. Like the LVIS-3E100, also the LVIS-ME200 is kept state-of-the-art and the software is constantly improved and extended with new features.

L-VIS the Great

Following the market trend of large screens ("size matters"), four new devices based on a new and powerful platform were presented in February 2010. In the LON segment, LVIS-3E100 is supplemented by two new devices with larger screens, the models LVIS-3E112 and LVIS-3E115. LVIS-ME212 and LVIS-ME215 supplement LVIS-ME200 for the integration in BACnet networks. The new screen sizes of 12" and 15" pro-

vide plenty of space to display detailed graphical projects as necessary for control centers, larger plants, but also conference rooms. While the 12" devices offer 800 x 600 pixels, the 15" devices provide 1024 x 768 pixels to the user, for visualization of his or her plant and direct operation via touch input. Simultaneously, color resolution was increased from VGA to 65k colors to improve the display of graphics and make a visually attractive design possible.

OPC XML/DA creates new application possibilities

With the implementation of the OPC XML/DA server and client functionality on all L-VIS models, further areas of application emerge. Now, L-VIS graphical projects can be displayed and operated through a web browser via LWEB-802. Graphical pages are provided by the L-VIS devices themselves. Because of using HTML5, the pages' full dynamics remain, without having to install a browser plug-in. But also when using L-VIS devices in combination with LOYTEC Automation Servers or IP based L-IOB I/O Controllers, the support of OPC XML/DA as a communication protocol offers significant advantages. For example, the configuration of a L-INX Automation Server can easily be imported in the L-VIS project and all data that is provided by the server via OPC is immediately accessible.

Modbus connection

Since version 5.0, besides the connection to LON or BACnet networks, all devices support connectivity to Modbus TCP, either as master or slave. Moreover, the devices of the BACnet series allow to connect to a Modbus RTU network as they are equipped with an RS-485 port. This port can be used either for the connection to a BACnet MS/TP or a Modbus RTU network. Also here, both master and slave are supported. This allows the direct connection of a Modbus counter or a weather station to the

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LOYTEC electronics GmbH

Christoph Zens is product manager of the L-VIS product family. Product development, both in the field of embedded systems and Windows, is part of his tasks. Hardware, operating systems, and application software for embedded systems and Windows, and also development tools fall within his area of competence. After his studies of computer technology at the Vienna University of Technology and a stay in California where he was involved in the development of a custom System-on-Chip for Coactive Networks, he started his employment at LOYTEC in 2001.

Cover Story

L-VIS device in systems where no dedicated Modbus gateway or L-INX Automation Servers is used. Of course, it is also possible to map Modbus data points to other technologies like LON or BACnet in the L-VIS.

Improved engineering software

With the increased use of the large models, also engineering became more and more complex. Nowadays, a few hundred screen pages with more than 20,000 display or input fields are not uncommon. In line with this development, the graphical editor for device configuration has been completely redesigned, and now offers better functions to edit also complex projects directly in the graphical preview. Many operations, e.g. the modification of an object's size or editing a vector control, have been newly implemented, for a smooth processing also on complex pages. In addition, the object tree that displays the project hierarchically has been revised and offers new functions that facilitate work with extensive projects. The most important new features include a selection preview that occurs while the cursor moves over the display, the selection of several adjacent objects through a selection box, the display of horizontal and vertical guides if selected objects shall be newly positioned or modified in their size, and also the snapping of objects to the edges of other objects or a predefined grid. Zooming and shifting of the preview has also been improved with new functions like the freely adjust-able zoom via mouse wheel, or the possibility to zoom to a freely selectable area of the preview. Objects can now be fixed in their position also individually, and not only as a group. This can be helpful when completing a screen page progressively.

New devices: The allrounder

For the 10th anniversary, the L-VIS family of devices is extended by a range of new devices. This new generation of devices offers both new products regarding screen size and equipment and also the merging of BACnet and LON models that have been available separately to date. The 12" devices LVIS-3E112 and LVIS-ME212 merge to LVIS-3ME12, while the 15" devices LVIS-3E115 and LVIS-ME215 are combined in LVIS-3ME15. The devices are equipped with a TP/FT-10 port for LON and an RS-485 port for BACnet, for simultaneous connection to LON and BACnet networks. Via RS-485, either BACnet MS/TP or Modbus RTU can be connected. The devices are optically and mechanically identical with the previous devices and the software is backward compatible with both existing LON and BACnet projects. Thus, they can be used as drop-in substitute for current installations. The merging of LON and BACnet models with simultaneous backward compatibility with existing projects simplifies many processes, from purchase, storage, and configuration, to maintenance of the devices in the field.

Frameless glass L-VIS with capacitive touch

Completely new are the glass L-VIS devices with 7" and 15". The glass surface provides a high-quality, modern appearance. The capacitive touch sensor allows for operation without any pressure on the surface – as we are accustomed to from smartphones or tablets. Because of the glass surface without any edges and

angles, the glass L-VIS is perfectly suitable for use in clean rooms or hygienically demanding areas such as care facilities or hospitals.

The LVIS-3ME7-Gx comes with silver or black glass front and features a 7" 800 x 480 pixel TFT panel in 16:9 widescreen format.

The LVIS-3ME15-Gx devices have the same features inside as the LVIS-3ME15 devices. Glass fronts can be ordered in silver, black, or white.

One for all

With the combination of BACnet and LON, using L-VIS becomes even simpler. All devices of the new generation make use of the same firmware. A differentiation in LON and BACnet devices is no longer necessary and unlike their 5.7" pendants, the new 7" devices do not require their own firmware anymore. The combined firmware offers all functions of the previous LON and BACnet models in one single device and also supports all LCD panels of the new generation, from 7" to 15". Of course, as before, the protocols Modbus TCP, Modbus RTU, and also OPC XML/DA are available in parallel to LON and BACnet.

www.loytec.com/lvis
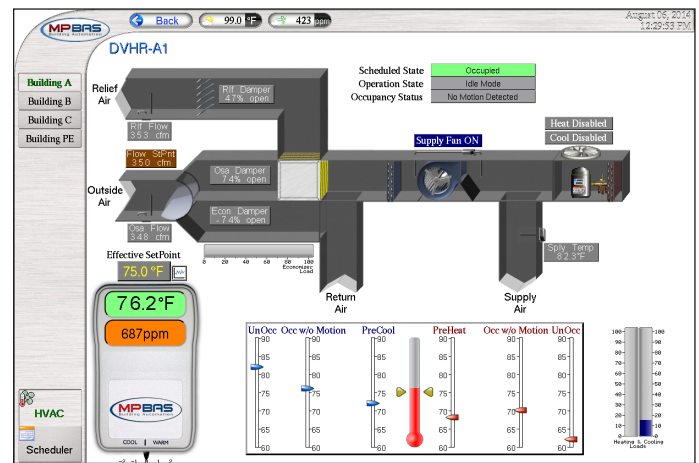
LOYTEC Americas

Mechanical Products BAS (MPBAS):
All-IP Solution

The high-level requirements of the new, algorithmic ventilation system of Heatherbrae Elementary School, part of the Cartwright School District, Arizona, USA open doors for LOYTEC Technology!

The LOYTEC Competence Partner Mechanical Products BAS (MPBAS) demonstrates the power of LOYTEC systems in conjunction with the manufacturer DeVenthere Industries to deliver a fully integrated, demand controlled ventilation and heat recovery system (DVHR) with added free cooling capability to meet ASHRAE standards 189.1 and 62.1 for Heatherbrae Elementary School.

MPBAS installed the project, controlling 30 new HVAC (Heating, Ventilation, and Air Conditioning) units with associated DVHR modules, 18 variable speed supply and exhaust fans along with integration to the existing campus, LON communicating building automation system. The project had to overcome special considerations with demand controlled ventilation and energy recovery.

MPBAS worked with the equipment provider DeVenthere, implementing an ALL-IP LOYTEC solution for operation and control of the patent pending DVHR system. The DVHR requires a sophisticated algorithm to control dampers, maintaining good indoor air quality, while transferring useful energy from exhausted air to intake air. MPBAS Engineering Manager Adam Wolfersberger, commenting on the programming: "LOYTEC's L-LOGICAD, with the powerful capabilities of combining graphical function block programming with structured text permitted the creation of custom function blocks for the complex DVHR algorithms, which proved impossible with graphical block programming alone."

Additionally, the product should support BACnet or LON communication in the same platform. LOYTEC's L-IOB controllers fullfill this requirement as the same programming is used regardless of communication.

Another challenge with the DVHR implementation is that to set calibration for dual air flow transducers would have required much coordination and shared labor between MPBAS and the air balancing contractor. MPBAS decided to leverage the L-IOB controllers distributed visualization capability to reduce labor costs. MPBAS created a custom L-WEB project in each LOYTEC controller specifically designed for the air balancing contractor. The air balancing contractor simply plugged into the network and did not require MPBAS support or special software to accomplish their balancing tasks. Therefore, all device configuration, local maintenance, and remote web visualization is available in each device. This is a huge advantage over standard field bus automation systems.

Project Materials:

48 LIOB-484 Controller

3 LOYTEC L-IP Router

L-WEB and L-LOGICAD   **www.mpbas.com**

What is DVHR (Demand Ventilation and Heat Recovery)?

DVHR combines heat recovery and demand control ventilation with airside economizer operation. Typically, these functions are accomplished separately. With the popularity of smaller packaged HVAC equipment, a distributed DVHR system can be employed. Additionally, the manufacturer states that DVHR technology reduces design oversize of heating and cooling equipment in high or low ambient temperature locales. The control is algorithmic, is verifiable, and responds to both metabolic activity and number of space occupants.

Innovative DALI Lighting System for Manchester Airport, Terminal 2

The Terminal 2 of Manchester Airport needed an energy saving solution for the lighting system of the building in course of renovation. For the implementation of the new system, the LOYTEC systems integrator Calon was put in charge.

The Solution

Calon, in cooperation with Building Environment Controls integrated a modern DALI lighting system with constant light control and occupancy detection in the Manchester Airport, terminal 2.

The lighting system is integrated in the airport's BMS and flight control systems via BACnet. This allows automatic configuration at each gate according to the flight departure and arrival schedules, time of day, and ambient light level.

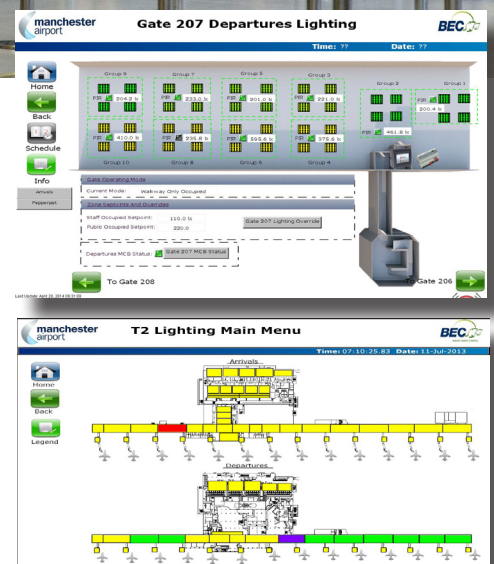The integral solution includes the following features:

- Daylight and occupancy based lighting control.

- Connection to the airport's "Flight Information System": The information regarding occupied gates is sent to the DALI lighting system. The set point is raised for occupied gates whereas it is lowered for currently unused gates.

- "Maintenance-free" due to the use of LED technology.

Altogether, 26 LOYTEC DALI Controller LDALI-ME204 are installed in the terminal. L-DALI Controllers are multifunctional devices for constant light control and gateway functions between BACnet and DALI (Digital Addressable Lighting Interface) systems. The controllers feature alarming, scheduling, and trending (AST™), and allow a smooth DALI integration into BACnet networks.

The integrated Constant Light Controller allows controlling local DALI ballasts and luminaires via the BACnet network. It supports various lighting control strategies, presence and lux level based. Several parameters can be used to configure the Constant Light Controller for almost any use case.

In emergency lighting systems, L-DALI can be used for testing the system. The results can be logged. For maximum transparency in the lighting system, L-DALI can record the operating hours of each lamp and also the projected energy consumption. The device configuration, commissioning, and parameterization of the connected DALI devices can be performed via the built-in web interface. Defective DALI ballasts can easily be replaced directly on the L-DALI Controller (LCD and jog dial) or via the web interface. No software tool is necessary.

Results

The new and more efficient luminaires that are used in the lighting system allow replacement savings of approximately 2,000 MWh annually. In addition, 1,000 MWh can be saved because of the automatic control functions of the installed lighting system.

Projects for lighting control of the public areas of Terminals 1 & 3 are already in the planning stage.

www.caloncontrols.com

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Troubleshooting
in BACnet Networks

Dipl.-Ing. Norbert Reiter

In a systems integrator's dream world, every network installation works properly right from the start, as the intuitive and simple technology leaves no room for misconfigurations. In such an ideal world, the single purpose of support is to accept the customer's congratulations for our brilliant products. The whole industry is working towards the achievement of this goal, unfortunately, it is not yet accomplished.

As a backup plan, we have integrated methods into our products, that ensure an effective detection of the communication problems' causes and to quickly achieve a solution. In this article, I would like to specifically focus on methods for troubleshooting in BACnet networks.

Something doesn't work…

Communication problems become visible, when "something doesn't work correctly". It can happen, that devices are not recognized on the network, data can't be transferred between devices, or data is received either only sometimes or delayed. The first step for troubleshooting is always to check the communication settings on the device. Using the example of BACnet, the following typical questions need to be clarified:

- Is the used BACnet interface correctly activated (BACnet/IP or BACnet MS/TP)?

- Was the basic communication setting (IP setting of the device, BACnet/IP port number, device instance number respectively MS/TP baud rate, MS/TP node number, etc.) done correctly?

Sometimes, also the diagnostic LEDs on the device may help – for example with MS/TP communication. The MS/TP LED on the device lights up, respectively flickers green if communication works properly. If no other MS/TP devices are recognized, the MS/TP LED flickers orange. A problem with communication – for example when a token is lost – is signaled by a red flickering MS/TP LED.

When this examination remains unsuccessful, in some cases, information on errors can be detected through the data points' status in the data point list on the integrated web interface. For example, you can see wether single data points are invalid or all data points do not contain any value.

What is going on here?

When all these simple diagnostics are unrewarding, it is time to observe communication. This is done with the help of a protocol analyzer that records each individual network packet that is exchanged between devices. For analyzing BACnet communication, the freely available analyzing software Wireshark (www.wireshark.org) gained acceptance. The software captures all

received packets through a network interface and represents them in a table view. Extensive filter and analyzing functions assist in finding the source of the problem. The crunch point is that of course "all received packets" are shown. In traditional IP networks, intelligent Ethernet switches have replaced the old Ethernet hub long ago. The switches are characterized by the fact that received packets are not transmitted to all other ports, but the switch learns the addresses of the connected devices and forwards the packets to individual ports in a targeted way. This also implies that the communication between two BACnet devices – for example one controller and one BACnet compatible touch display such as the L-VIS device – can't be easily logged with a PC, even though the PC is connected with the same Ethernet switch. Experienced BACnet integrators are aware of that, thus they always bring along a hub in their tool box. Unfortunately, Ethernet hubs are rarely sold nowadays or are just available on the second-hand market. In order to analyze the MS/TP traffic, an Ethernet hub is not enough. For that purpose, an RS-485-to-USB adapter is needed. However, this adapters are also rare.

That is why LOYTEC incorporated a specific function in the devices to record data for the Wireshark software directly, without the need of additional hardware.

Data recording at close range ...

The simplest way is to start and stop data recording directly in the device. After that, the generated capture file needs to be loaded from the device using the web browser. The file can then be simply opened and further analyzed in Wireshark. This method is ideal for fast data capturing over a short period of time.

For this purpose, one connects with the

device via a web browser – in our example, with a LINX-151. In the menu item Statistics -> Packet Capture, there is the user interface, as depicted in fig. 1. First,

Fig. 1: Local packet capture on the web interface

all available interfaces for recording are shown. Here, it is an Ethernet interface and in case of a BACnet device, additionally a BACnet MS/TP interface. The status under "Remote capture" indicates whether data is currently recorded via remote access – learn more about this in the next section. To start local data capturing, press the "Start" button in the corresponding row. Afterwards, appropriate actions need to be taken on the network in order to generate the recorded network traffic. Data capturing ends with "Stop". To download the recorded data as a zip packet from the device, select "Download capture files". The contained file of the type „.pcapng" can be opened directly in Wireshark for further analysis.

Since a large volume of data is immediately generated during recording on the Ethernet interface, it is possible to define capture filters directly in the device in the dialog under "Local Filter editor". The creation of filter rules via the drop down list should be self-explanatory. As filter rules, the selection of IP addresses and IP ports for source and target address and also the selection of the host are available.

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Norbert Reiter heads the support and training unit at LOYTEC. In this capacity he has established and developed LOYTEC's comprehensive training programs. He is an instructor of many training sessions himself, domestic and abroad. After studying computer technology at University of Technology Vienna, Norbert joined LOYTEC 12 years ago. He had significant contributions to the development of the ORION stack, several software tools and LOYTEC network infrastructure products.
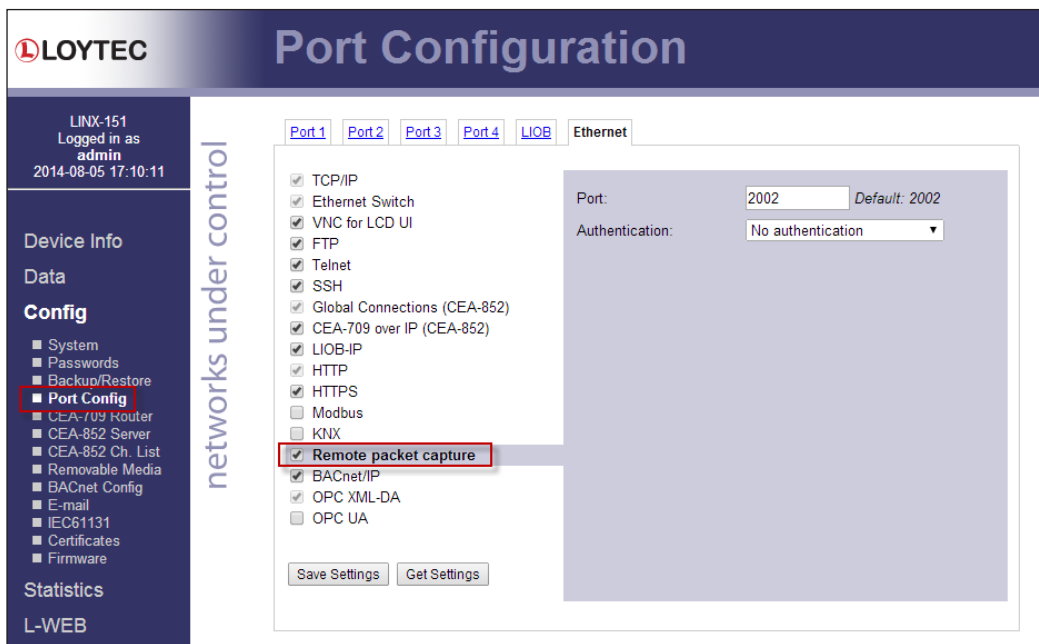
Support Tip

Fig. 2: Activation of the Wireshark interface

By defining several filter expressions, multiple filter rules can be linked.

…and from remote

Another possibility is to use the device as an external interface for a Wireshark software, running on a PC. This is necessary if data is recorded over a longer period of time and the log file would exceed the storage capacity of the device employed in diagnosis. The required configuration is shown again using the example of LINX-151.

You have to log in as "admin" on the web interface of the device. In the menu "Config -> Port Config", you change to the Ethernet page and set the "Remote Packet capture" flag. If required, the port number can be adapted and also a username and a password for securing the connection can be entered optionally (Fig. 2). With the button "Save Settings", the changes are accepted. A device restart is not necessary.

In the next step, the L-INX needs to be configured as new interface in Wireshark in choosing the item "Interfaces" in the "Cap-ture" menu. In the following dialog you can open a new dialog with detailed information on data capturing (Capture Options) via the button "Options". The button "Manage Interfaces" opens a window, in which the interfaces are managed for capturing. At first, the window "Remote Interfaces" must be chosen. The button "Add" opens a dialog. There, the IP address, the port (default: 2002), and also optionally user name and password, as previously configured in L-INX, need to be specified. When closing the dialog, Wire-shark automatically connects to the device and reads the list of all capture interfaces available. In case of BACnet devices with activated MS/TP port, another MS/TP port is shown, in addition to the Ethernet interface (Fig. 3).

Before starting the Wireshark log, you just have to choose the desired interface in the "Capture Interfaces" dialog. After starting recording, the packets can be analyzed immediately in a live view.

What does this mean?

What does the log file reveal? At the beginning, the number of displayed information seems confusing, as all received communication packets are shown. The next immediate step is to filter the interesting packets.

In a first attempt, you can directly filter packets by entering keywords in the row "Filter". The use of only few terms is helpful at the beginning.

When entering "bacnet", only packets of the BACnet protocol are

depicted. Via the keyword ip.addr == <ip-adresse>, you can filter specific IP addresses. Several filter expressions can be combined via the symbol "&&". In order to view BACnet packets with the IP address 192.168.1.2, enter „bacnet && (ip.addr==192.168.1.2)" in the field "Filter".

Thereby, the flood of displayed data packets can be significantly reduced. To further filter individual packet types, Wireshark offers other convenient functions: If a packet is selected in the list, the packet information is shown in detail according to the protocol layer, in the underlying view. In this example, the BACnet MS/TP information is of interest for us. If you are only interested in BACnet data packets, the tokens need to be deactivated. For this purpose, select a BACnet MS/TP token packet in order to view the details. In expanding the BACnet MS/TP information, the row "Frame Type:Token (0)" is revealed. To hide this packet type, select the row and open the context menu with a right mouse click. The menu item "Apply as Filter -> Selected" automatically generates an appropriate filter rule for hiding this packet type (Figure 4). To apply further filter rules to the remaining packets, additional rules can be defined in exactly the same way via the menu item "Apply as Filter -> and Selected".
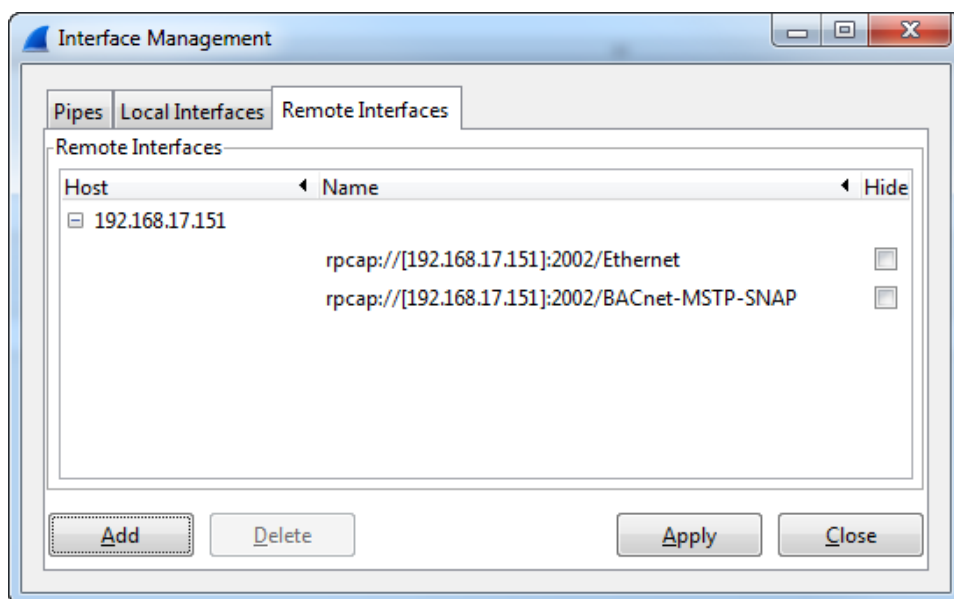

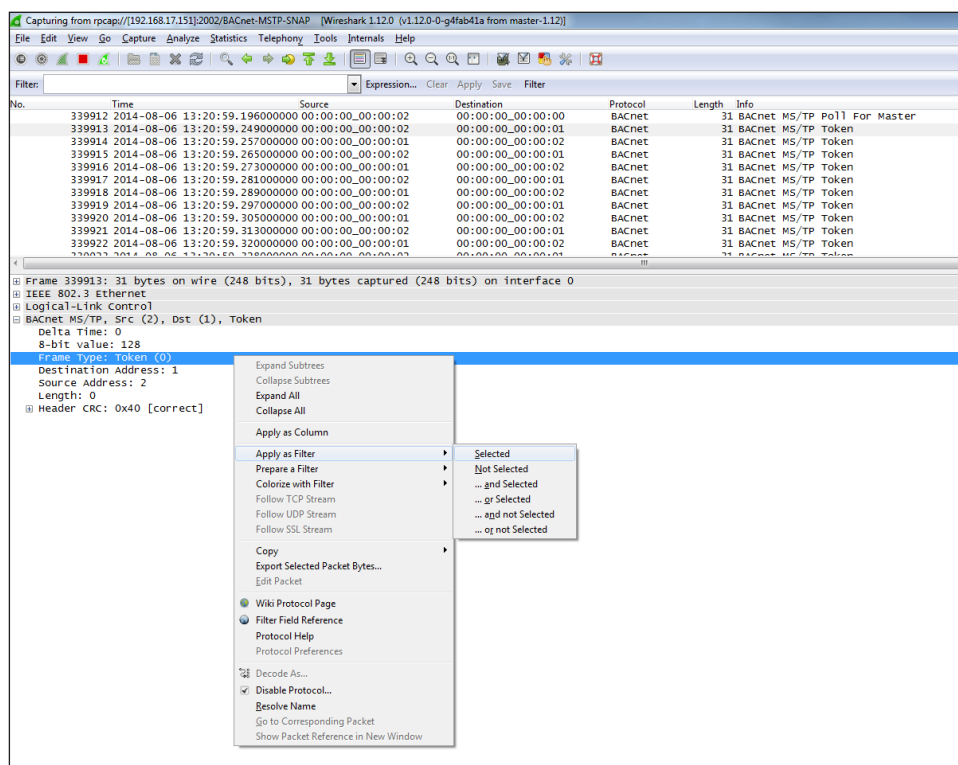Fig. 3: Remote interfaces at Wireshark software

Fig. 4: Filter rules in Wireshark

Forewarned is forearmed

With some knowledge about BACnet communication, statements about the causes of problems in BACnet networks can be made. Even though there is no configuration problem and the error cannot be resolved immediately, the log files contain all relevant information for the device manufacturers in order to detect and consequently resolve complex compatibility problems – another step towards the ideal world of a system integrator.

www.loytec.com/support

Venba Tech:
LOYTEC Technology Establishes in India

Venba Tech, an Indian based building automation company, established in 2009, has recently entered into a partnership agreement with LOYTEC for providing intelligent building management solutions. Thereby, Venba Tech has already commissioned two projects and has recently won a large contract from a leading developer in Bangalore for their shopping mall, office, and hotel development.

Venba specializes in the following:

- Making the client's homes smart and secure through home automation solutions under the brand name Clove Labs.

- Making the client's buildings intelligent, efficient, and easy to manage through IBMS (Integrated Building Management Systems).

- Detailed designing for the implementation of controls for efficient Building Management.

Venba Tech has over 5 years of proven track record of many successful projects including homes, hotels, malls, IT parks, and office buildings and is currently operating and maintaining buildings on the IBMS front, totaling over 2.5 million square feet.

Venba Tech receives great recognition from their customers who reward them with repeat orders and expanded scope. The company was further awarded with:

1. India Mart "Leaders of Tomorrow 2013 Energy Conservation Award",

2. India Mart "Leaders of Tomorrow Women Entrepreneur 2013 Award" given to Venba Tech's Founder & Managing Director Ms. Bhanumathy Venkat.

The capabilities include end-to-end solutions from consultancy, design, engineering, installation, and commissioning to

operation and maintenance. The clients enjoy the following benefits of Venba Tech's differentiation:

- Solutions based on globally established open platforms – hence not tied to proprietary products which come with many restrictions. This was one of the objectives of partnering with LOYTEC for controls.

- Easy and intuitive icon based control from smart phones or tablets that allows an ease of monitoring and management from anywhere. Venba is working towards a cloud based control.

- Energy savings through efficient operation of the BMS (Building Management System) – Venba provides operations and maintenance services for BMS done by any vendor.

AKDR Tower in Chennai

AKDR Tower, an IT building in Chennai measures around 300,000 square feet and is a multitenant commercial building that mainly houses information technology companies.

In 2010, Venba Tech was commissioned to design an efficient BMS solution to integrate chillers, pumps, variable frequency drives (VFD), air handling units, variable air volumes, ventilation fans, energy meters, BTU meters (British thermal unit), etc. Venba completed the design and awarded the contract to one of the leading building automation vendors who was engaged for execution. The system was commissioned and brought into operation in 2012. The customer simultaneously engaged Venba to carry out the operation and maintenance of the building through BMS.

In 2013, the existing BMS software needed an upgrade. The existing platform was proprietary and therefore vendor dependent. The client felt the need of an open, vendor independent platform that can be expanded easily by securing his investment at the same time.

With BACnet/IP, an open platform architecture was suggested to the client. The existing controllers from a third party had support for BACnet/IP. What was needed, was a platform that integrates protocols such as LON, BACnet, DALI, M-BUS, Modbus, KNX, etc. Hence, the migration was designed using LOYTEC's distributed servers, interfaces that support all the mentioned open protocols.

The existing BACnet controllers of the third party are directly connected to LGATE-950. Modbus integration of energy meters, diesel generator, and VFDs was done using LINX-200. M-BUS was integrated with L-MBUS connected to L-GATE. Chiller plants and pumps were linked to LGATE-950 and the graphical user interface LWEB-803 is used for visualization. Venba migrates from a closed, proprietary platform of third party to an open protocol platform of LOYTEC. The existing third party BACnet controllers will be gradually exchanged with LOYTEC's BACnet controllers in stages during the following months. As a final step, it is planned to shift the visualization to LWEB-900. This sophisticated interface will further enhance the reporting and management functions.

The final end result, a happy customer who is confident about the provided LOYTEC solution, speaks for itself.

RMZ Galleria, Bangalore

RMZ is a leading developer, headquartered in Bangalore, South of India. RMZ is currently developing the mixed development project "Galleria" that includes a retail, office, and hotel block in Bangalore.

The built-up area of the premium shopping mall will cover about 800,000 square feet with shopping areas in the ground floor, first floor, and second floor. The third floor will house a state-of-the-art 5 screens multiplex. The area for offices and hotel will add up to 400,000 square feet. RMZ Galleria will have three additional basements located below the lower ground floor for parking purposes and service areas.

The BMS solution includes monitoring and controlling of chiller plants, AHUs (air handling units), and CSUs (ceiling-suspended units) over BACnet. Moreover, it is in charge of monitoring and controlling the ventilation and plumbing system. The BMS features lighting control over KNX, energy meters, diesel generators and also fire alarm integration over Modbus, and BTU meters over M-BUS.

The building has three control rooms. The Building Management System LWEB-900 will act as the core in all three developments. The system architecture includes LGATE-950, LINX-200, L-IOB I/O Controllers and I/O Modules, L-KNX, and L-MBUS which will be distributed throughout the project.

Altogether, the project includes 5,700 hardware and software input/output points. The estimated time of completion is the 2nd quarter of 2015. This is the first big win for the Venba/LOYTEC partnership.

www.venbatech.com

LWEB-900 becomes a BACnet Operator Workstation

Starting with version 2.0, the building management software LWEB-900 becomes a BACnet Operator Workstation (B-OWS). In this role, LWEB-900 not only communicates with LOYTEC devices, but also with third party BACnet devices. In addition, tenders that require a BACnet only solution can be fulfilled.

The integrated building management software LWEB-900 provides a user interface to manage and operate a LOYTEC building management system. Information from the building can be visualized in many different ways. The various display formats are referred to as views. Views can be freely configured and optimally customized by the user.
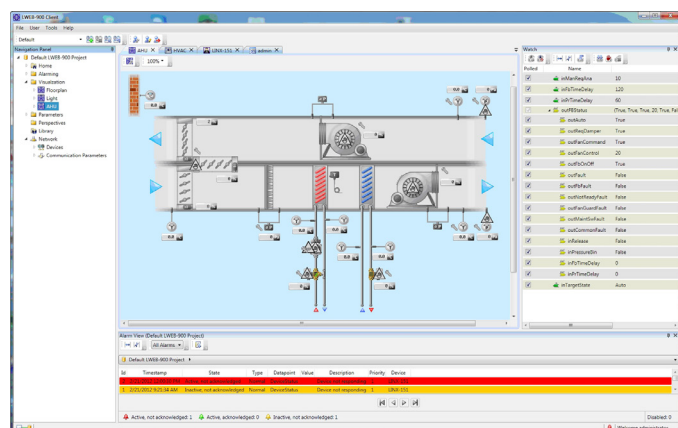

Fig. 1: LWEB-900 client user interface

Fig. 1 depicts an example of the LWEB-900 user interface. The navigation view on the left displays all components of the building management system in a tree view. A graphical representation of an air handler is placed in the middle. On the right side, a watch view is displayed, that presents data of a building quickly and easily. In order to show e.g. trends, schedulers, or reports, additional views are available.

To depict building information, LWEB-900 has to communicate with field devices. Version 1.x was initially designed to only support LOYTEC devices. The communication with LOYTEC devices is handled via web services. Starting with LWEB-900 version 2.0, BACnet/IP is additionally supported. Thereby, external devices can be directly integrated in LWEB-900. The representation of data in views is independent of the used communication protocol.

Integrate BACnet devices in LWEB-900

LWEB-900 allows to scan the BACnet network and add detected devices (see fig.2).

By importing an EDE file (Engineering Data Exchange), devices that are not yet installed can be added manually.
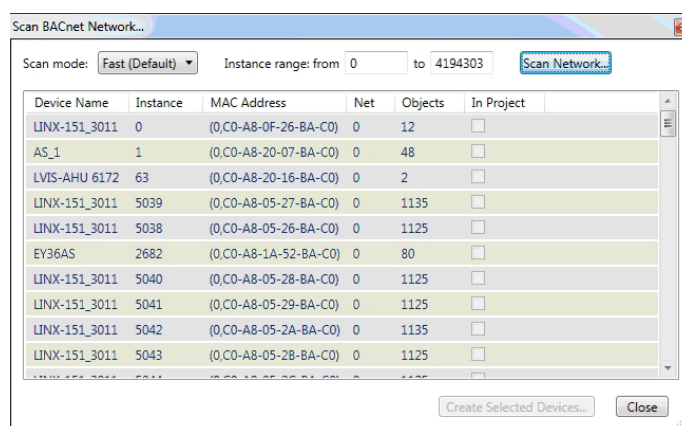

Fig. 2: BACnet network scan

BACnet objects

Each BACnet device consists of a collection of BACnet objects. Objects are described by properties. Typical properties are for example present value, name, description, unit, and alarm information. Figure 3 shows a BACnet device in the navigation view. BACnet objects are grouped into folders according to their type. Properties are sub elements of BACnet objects.
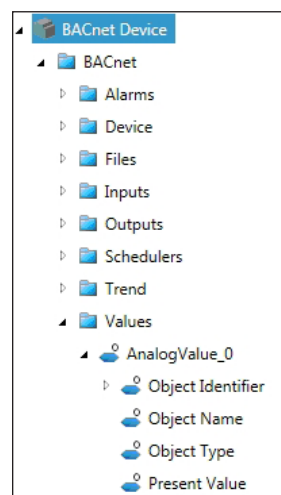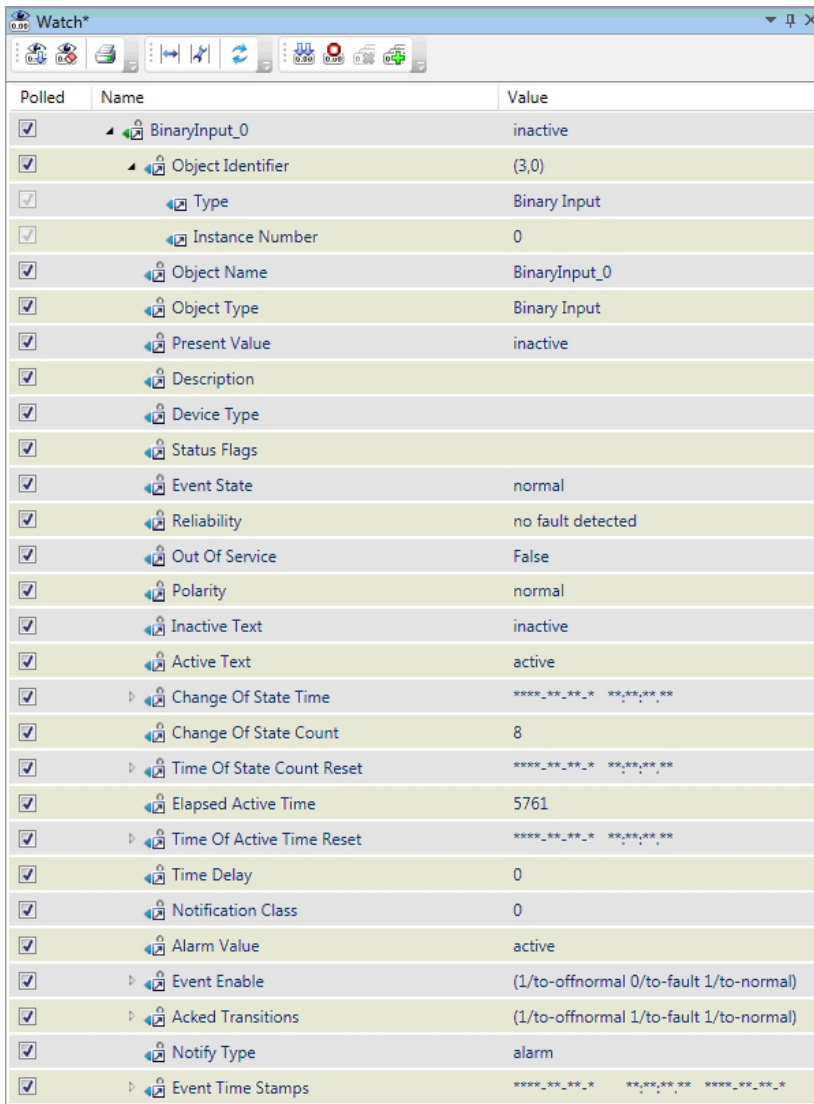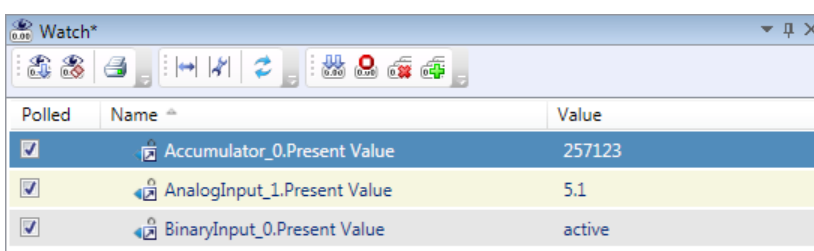

Fig. 3: BACnet device in navigation view

In LWEB-900, entire BACnet objects or only single properties can be dragged into a watch view. Fig. 4 shows an example of a "Binary Input" object in the watch view. Object properties are depicted as sub data points and can be changed if properties are writable. Fig. 5 shows that it is also possible to represent only specific object properties in a watch view (e.g. Present Value).

Fig. 4: Binary Input Object in the watch view

Fig. 5: Property "Present Value" of different objects in the watch view

In BACnet, a priority needs to be specified when writing the Present Value of output objects. Only the command with the highest priority has an impact on the Present Value. LWEB-900 offers the opportunity to either set the Present Value with a configurable standard priority or choose a specific priority. This applies both to watch view and also graphical view.

Alarms, schedulers, trends

LWEB-900 processes BACnet alarms and displays them in the alarm view. There, filters can be defined, and alarms can be acknowledged and disabled. The event log records all alarm inputs. If an alarm occurs, LWEB-900 informs one or more recipients per email. With the help of schedulers, different persons can be informed, depending on the weekday and time.

In LWEB-900, BACnet scheduler and calendar objects and their properties can be depicted and modified. Schedulers can be hierarchically structured in the scheduler view, regardless of where they are carried out. It is thus possible to define entries that have an effect on all or only a subset of schedulers. This way it is possible, for example, to configure a standard time schedule for an entire building. For specific parts of the building, this global scheduler can be extended or updated by additional entries. In turn, the entries for the building parts can be extended by room-specific entries.

In addition, BACnet trend log objects and their properties can be displayed and modified. Recorded data can be visualized in trend graphs or reports.

Management of BACnet devices

BACnet devices can be easily managed by LWEB-900. The backup feature allows to define schedules for a regular backup of BACnet devices. Of course, backups for a specific device can be done at any time. Moreover, it is possible to reset BACnet devices or perform a time synchronization.

Conclusion

Starting with version 2.0, LWEB-900 supports BACnet devices of third-party manufacturers. This release is scheduled for the end of 2014. The different views of LWEB-900 allow an optimal representation of information from the building management system for different user groups. The watch view provides direct access to BACnet objects and all their properties. This high level of detail is important for systems integrators but might confuse end consumers that are not familiar with the BACnet technology. For this user group, it is possible to create custom graphical views, alarm views, reports, etc. Last but not least, LWEB-900 features a sophisticated user management system in order to define user rights.

www.loytec.com/lweb-900

PRODUCT NEWS
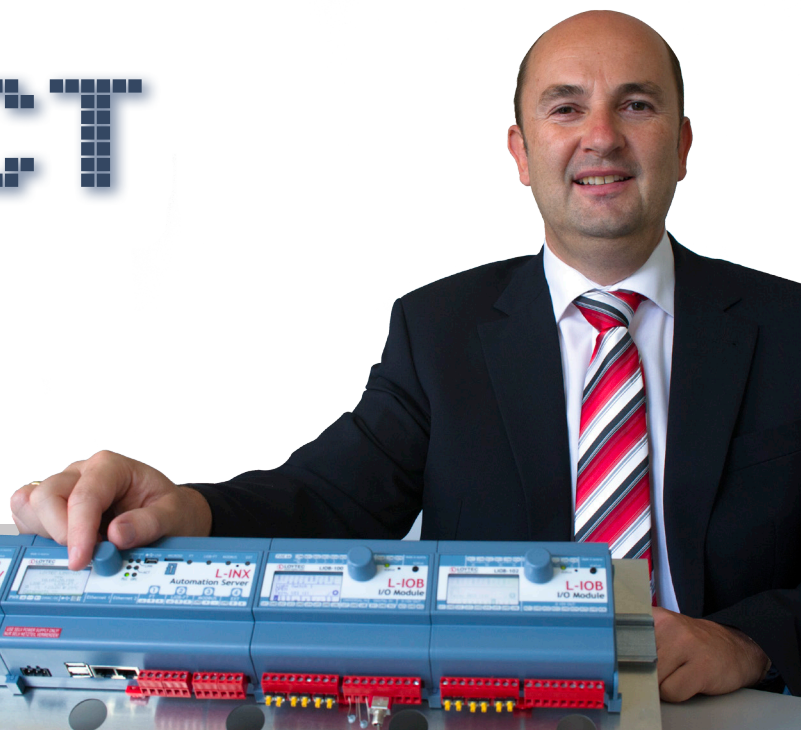
L-VIS Panels now with frameless glass front and capacitive touch

The glass L-VIS devices with 7" and 15" displays are the new members of the L-VIS product family. The glass surface provides a high-quality, modern appearance. The capacitive touch sensor allows for operation without any pressure on the surface – as we are accustomed to from smartphones or tablets. Because of the glass surface without any corners and edges, the glass L-VIS is also perfectly suitable for use in clean rooms or hygienically demanding areas such as care facilities or hospitals.

The LVIS-3ME7-Gx comes with a silver or black glass front and features a 7" 800x480 pixel TFT panel in 16:9 widescreen format.

The LVIS-3ME15-Gx devices have the same features inside as the LVIS-3ME15 devices. Glass fronts can be ordered in silver, black, or white.

the data point list, a breadcrumb navigation for faster navigation between subfolders, a trend overview page and also a DALI group page that allows for directly switching on and off groups to test group assignment. Moreover, math objects, e-mail templates, and alarm logs can be organized in folders.

Please find a complete list of all new features in the respective user manual on www.loytec.com.

The new features of the L-DALI 3.2 Release

The constant light controller modes CONTROL, REGULATOR, and PRESENCE are now available as variations with the addition AUTO. Thereby it is ensured that the room switches back to automatic mode when unoccupied. For decorative lighting like a shop window lighting, the mode AMBIENT can be used. The constant light controller application detects an override of DALI groups by another DALI master. DALI pushbutton couplers or similar control devices can be used as a DALI master. The LDALI-10x models support DALI ballasts both with variable color temperature like a gradient that follows the progression of the sun (biorhythm) and ones with colored light. Additionally, generic schedulers – together with generic trends and alarms – can be created, that neither require CEA-709 nor BACnet objects. This is beneficial for creating technology-independent applications. The web interface of the devices now features live updates of values in
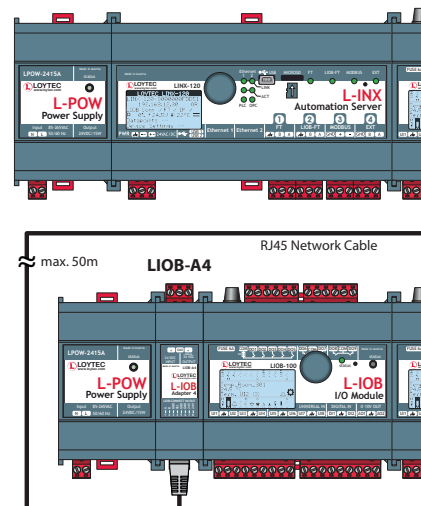
Connection of EnOcean devices

Starting with firmware version 5.1, LINX-120/121/220/221/150/151 Automation Servers and LGATE-950/951 Gateways provide connectivity to EnOcean sensors and actuators. After connecting a LENO-800 EnOcean interface to the USB port of a L-INX/L-GATE, data in the frequency range of 868 MHz can be received by and also sent to any EnOcean device. These "EnOcean data points" can be further processed in L-INX/L-GATE and/or be passed on to any communication interface (CEA-709, BACnet, KNX, Modbus, MBus). Moreover, EnOcean devices with activated security are also supported. Sensors are monitored and in case of a failure, an alarm is triggered.

EnOcean devices are commissioned using the web interface of L-INX/L-GATE. They are defined in the Configurator and the physical installed EnOcean sensors and actuators are assigned to the predefined EnOcean devices by means of the "Teach-In" function of the web interface. Alternatively, the "Device ID" of the EnOcean device can be directly entered in the web interface. The EnOcean device library that is provided with the Configurator can be freely adapted and extended.

Live data of EnOcean devices can be displayed on the web interface of L-INX/L-GATE. The RSSI indicator provides a good overview of the signal quality of received EnOcean telegrams. By means of the parameters "Description" and "Location", it is possible to store both the installation location and a device description. A maximum of 100 EnOcean devices with up to 1,000 EnOcean data points are supported per L-INX/L-GATE.

New L-IOB adapters

In addition to the existing LIOB-A2 adapters that can be used to extend the LIOB-Connect bus and to connect an external power supply, the compact LIOB-A4 and LIOB-A5 adapters were newly added to the L-IOB product family. The LIOB-A4 adapter has the same functions as its predecessor LIOB-A2, except for the termination at the end of the LIOB-Connect chain. This function is performed by the LIOB-A5 adapter which is used to terminate the LIOB-Connect bus at the end of the last segment.

Basically, 24 LIOB-Connect I/O Modules can be connected through the LIOB-Connect bus. The corresponding models are LIOB-100, LIOB-101, LIOB-102, and LIOB-103. Up to 4 LIOB-Connect I/O Modules can be connected directly using the built-in LIOB-Connect plug. If more than 4 modules are to be used,

the LIOB-Connect chain must be split into two (or more) segments of modules using LIOB-A4 adapters and standard RJ45 network cables. Each segment needs an external power supply, e.g. LPOW-2415A. This means that with a full configuration of 24 LIOB-Connect I/O Modules, five additional power supplies and 10 LIOB-A4 adapters are required. If the length exceeds 1 m, a LIOB-A5 adapter must be used at the end of the last segment as a termination.

Additionally, the L-IOB adapters have a power output usable for external devices. For the new LIOB-A4 and LIOB-A5 adapters, the maximum current of the power output was raised from 100 mA to 400 mA (in comparison to the existing LIOB-A2 adapters).
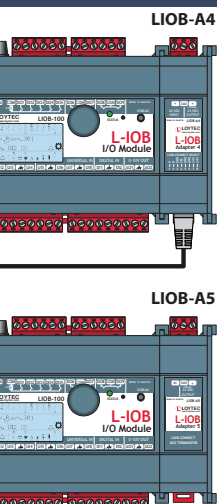
Building Automation – Quo vadis*?

DI Dr. Gerhard Zucker

* Where are you going?

Thanks to communication standards like LonWorks, KNX, and BACnet, building automation systems speak a common language nowadays. At least in functional buildings, the Babylonian language diversity is no longer prevailing. But we also learned, that the desire for seamless interoperability can not be fulfilled by that alone. App stores like the ones already existing for smartphones and tablets that provide the user with countless creative ideas are still not in sight for the building sector. The reason for that are closed proprietary systems that mainly result from the fear of market share loss. However, a breakthrough in this market is only possible when everyone pulls together. The mobile sector has impressively demonstrated that only uniform standards for communication and apps have created the market that exists nowadays. To stay with the analogy: What is needed today to create an open platform where building apps of third parties from all over the world can be developed? And do we really need that?

The highest commandment: Energy efficiency and user comfort

At least the second question can be answered clearly: In Austria, the federal energy efficiency law was passed this summer. According to this law, energy savings of the capacity of approximately 14 Danube hydropower plants are planned. According to the law, large companies are now obliged to either implement an energy management system or conduct an energy audit every four years. In addition, there are of course also the 20-20-20 objectives of the EU. Until 2020, the greenhouse gas emissions shall be reduced by 20%, the share of renewable energy increased to 20%, and the energy efficiency increased by 20%. If we also consider the fact that buildings, with a primary energy consumption of about 40%, are among the biggest energy consumers, it can be assumed that energy efficient building operation will experience a strong tailwind in the future.

Energy efficiency can only be achieved if all components are perfectly synchronized. The vision of the plus energy house with maximum integration of renewable energy will only succeed with a simultaneous optimization of the operation. This requires intelligent energy management as well as meaningful user integration. The control and regulation of building services with its complex connections are in good hands with automation: The drive back of the ventilation system or the delayed charge of a water reservoir are core tasks of building services. The user should just receive useful feedback which firstly is self-explanatory and secondly can be directly influenced by him. Through this measures, a positive awareness for the economical use of energy can be raised, without causing boredom. An example is the "Eco button" in modern building technology that the user can push to actively contribute to energy efficiency. Thereby, it is particularly important that the concept is easily comprehensible and plausible for the user in order to become a daily routine and

not to pass out of mind because of falling interest.

Open platforms for broad applications and flexible operation

Of course, this new type of interoperability represents a challenge: The slogan "everything from a single source" is not the best business model for building automation. It is better to leave data analysis to business analytics experts and gamification of user integration to smart phone programmers. Also the management of building portfolios can be best solved with expertise from the Enterprise Resource Planning (ERP) than from a building automation engineer. With an open platform, appropriate interfaces could be made available to individual specialists, where they can attach their applications – whether sunblind controls, heating, lighting scenarios, multimedia controls, alarm systems, or a module for the cost center based offsetting of CO_2 savings. Moreover, also the possibility of transferring services like monitoring, analysis, and optimization of energy consumption to the cloud emerges, which reduces the load on internal capacities.

On a uniform, open platform, a control strategy for comfort violation and energy consumption can be tested and appropriate optimization measures can be defined. Here, a far better coupling between research and building automation is required. Approaches from research, e.g. the use of simulation to estimate the impact of control, device choice, or usage on efficiency already beforehand, have to be included in engineering, or better still, in planning. It is far from ideal to adjust the measurement and control technology subsequently and implement it just a week before delivery. In addition, research allows to advance rigid, preprogrammed control concepts to a model-based control. By means of algorithms and models, it is possible to describe the system "building" comprehensively and predict in simulations how the building would react in case of defined occupancy

or specific weather conditions. This future outlook can be integrated in the control system and permanently updated with new input parameters to adapt the control strategy to new requirements.

Benefits for manufacturers, private users, and building operators

While building automation has been long established in offices and public buildings, it has not yet properly managed to win through in private households, because of high costs. Cheaper products can only be achieved through large volumes, but only if a solution really performs all "homework" like weather and occupancy based heating and automatic control of lighting, alarm system, beamer, multimedia center, or sun blinds. Nowadays, for example heat pump manufacturers are still forced to develop an additional individual room control autonomously, since there is a lack of vendor-independent alternatives. Of course, this solution doesn't work together with lighting, which however is difficult to sell to the user. It also reminds of the fact that even today, TVs, DVD players, and multimedia centers require different remote controls. Here too, an open platform could be a decisive trigger for the development of a wide range of applications that are mutually compatible and user-friendly.

Especially in home automation, the technology question is, at best, secondary to the user. What counts is the clear benefit. To pick up the above-mentioned Eco button once more: For most of the users, energy saving is as interesting as the tax declaration. So why not choose the location of the Eco button next to the door, where it should be pushed when the last resident is leaving? It doesn't have to be called Eco button, it is maybe rather an occupancy switch that centrally switches off the light and simultaneously activates the alarm system – this is understandable

„Energy efficiency can only be achieved if all components are perfectly synchronized."

DI Dr. Gerhard Zucker
Austrian Institute of Technology

Gerhard Zucker is senior researcher at the Austrian Institute of Technology (AIT) in the field of sustainable building technology. His area of research covers building automation and building control for the purpose of optimizing energy efficiency. In 2006, he graduated from the Technical University (TU) of Vienna. After that, he worked on different projects in the areas of building automation and artificial intelligence. Mr. Zucker published two books and numerous scientific publications. He is a member of OVE and IEEE, mainly in the Technical Committee Building Automation, Control, and Management (TC BACM) und as associate editor in the IEEE Journal "Transactions on Industrial Informatics".
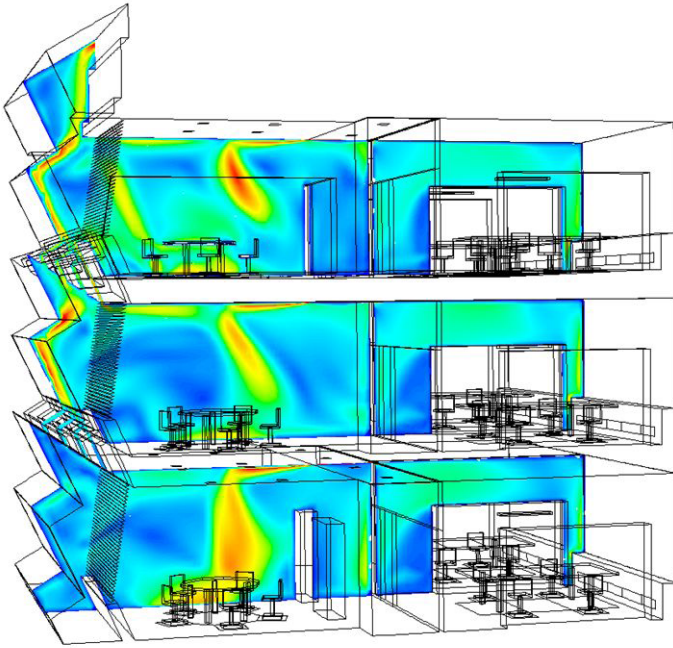
and immediately verifiable for the user. That, at the same time, also heating is turned down a few degrees and some consumers are switched off, has a positive impact on energy efficiency, and we have reached our goal.

Also if energy efficiency is not the highest priority for an office operator, one can offer him instead an optimally controlled interior comfort for his employees where temperature and humidity never leave the comfort zone of the h-x diagram. In fact, this is also energy optimized since the new comfort control of course considers energy consumption. However, the main point is that the healthier room climate reduces the amount of sick days and increases the efficiency of the office.

A step beyond building boundaries

The building is not only an individual system with numerous components, but rather a single component of the system "city". Based on this "system of systems" approach, energy management doesn't end with building management, but begins at the next higher level, as city energy management. Consequently, smart buildings not only improve their energy efficiency, but also act beyond building boundaries, and thus become active participants and contractors in the energy system. A crucial prerequisite is that buildings open up to the outside and exchange information with the network. In the future, buildings will be able to support energy networks in peak times, and hence, because of this two-way communication, facilitate the integration of renewable energy sources. For the implementation of these new business models, an open, standardized access to buildings will be necessary in the future, in order to communicate and interact with the building and its systems via uniform interfaces. Modern IKT technologies like the cloud or the Internet of Things are important technological prerequisites to achieve multiplier effects, thereby laying the foundation of tomorrow's smart cities.

www.ait.ac.at

LOYTEC Building Management in Brazilian Shopping Center

In the „Passeio des Águas Shopping", a newly built shopping center in Goiânia, Brazil, the LOYTEC system integrator Sistavac installed HVAC, lighting, and energy metering systems, controlled and monitored by LOYTEC components.

Sonae Sierra, the international shopping center specialist, is expanding the Shopping Mall's portfolio in Brazil, developing a new project in Goiânia, the "Passeio das Águas Shopping", which is one of the largest commercial centers of South America. It has 779,000 m², 259 shops, 4,000 parking places and is managed directly by the owner.

The shopping mall uses the most modern eco-efficient solutions that significantly reduce waste of energy and water consumption, by fulfilling the rigid rules of the ambient management system of Sonae Sierra Brazil.

The HVAC, lighting, and energy metering systems, installed and developed by Sistavac, are controlled and monitored by LOYTEC components, more precisely by L-INX Automation Servers, L-IOB I/O Controllers, and the SCADA system LWEB-900 that allows the maintenance staff full control and efficient monitoring of the systems. The Building Management System runs on a fully redundant IP network to ensure fast and reliable communication.

Different functions are part of the integral solution. The LOYTEC components take over control of the cooling system via LON integration. In addition, the ventilation system and also the entire lighting is controlled. Alarms informing about critical states are detected and forwarded to the system supervisors for swift troubleshooting. The system monitors both energy- and water consumption by performing measurements and generating reports about the consumption levels.
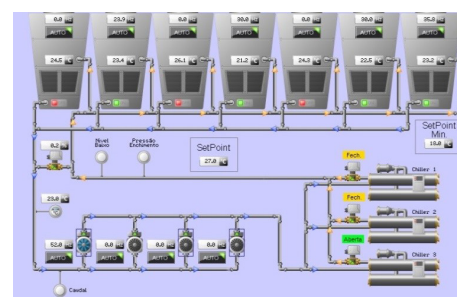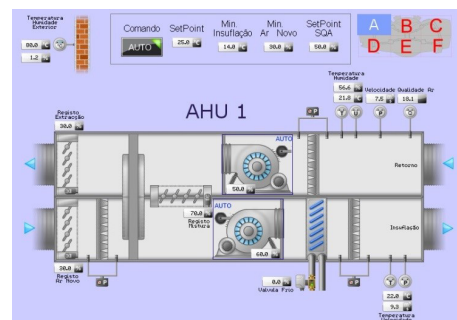
Monitored are likewise the mechanical transportation and also the water pumping systems. A fire detection function is integrated via Modbus.

www.sistavac.pt
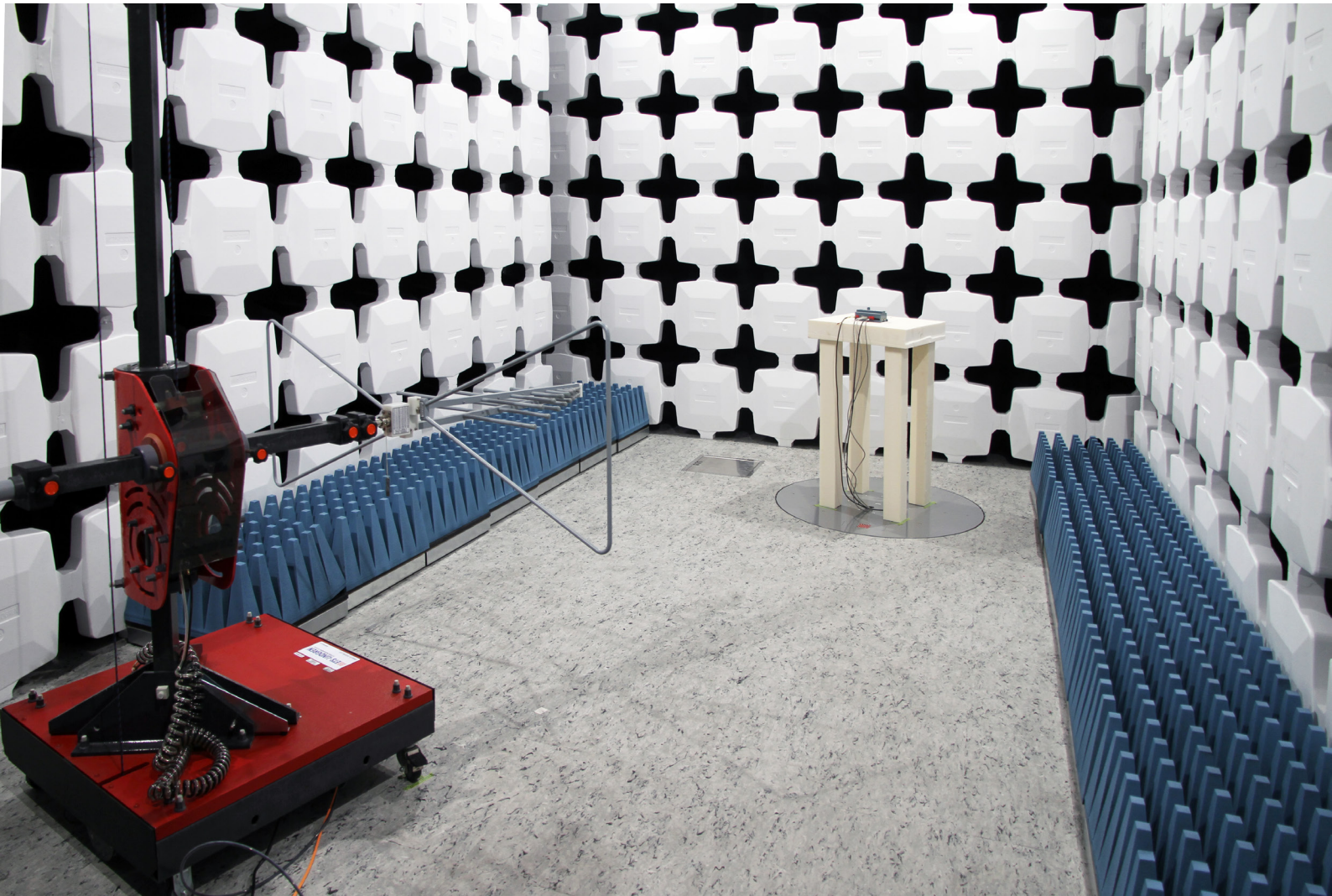
New LOYTEC Test Laboratory:
The Harsh Room

Since the company was founded in 1999, LOYTEC has developed hardware platforms for all products of the meanwhile very extensive product catalog with its own hardware development team. The requirements of modern hardware are growing constantly and the used technologies are becoming increasingly complex. This includes microcontrollers with frequencies of several hundred MHz, DDR and eMMC memory, several Ethernet interfaces, WLAN, EnOcean radio, USB ports, SD cards, CEA-709 interfaces, RS-485 ports for MS/TP or Modbus, M-BUS, KNX, DALI, SMI, finger scanner, LIOB ports, LCD displays, capacitive touch interfaces, universal power sup-

plies. The number of required interfaces is steadily increasing with no end in sight.

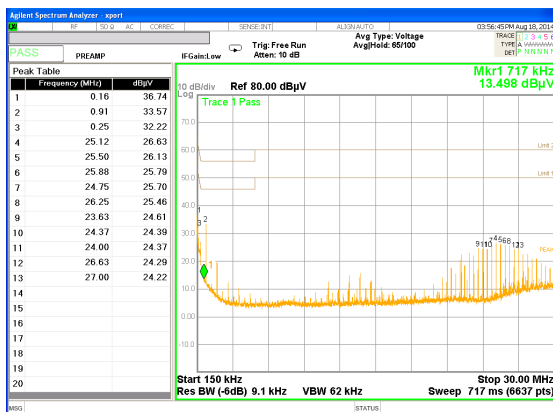Each new development, but also each improvement of an existing product requires processing a long list of hardware checks. It begins with an MTBF calculation for the assembly, the simulation of specific parts of the circuit, the electrical verification of signals on the printed circuit board, the thermal stress test between -40°C and +80°C, the functional verification of communication interfaces, and also an extensive number of checks according to the product norms to be met. Thereby, the safety of a product (fire hazard, personal protection) is checked just

as the reaction of the product to interfering signals from adjacent products, as well as the emission of the product itself. Interferences can affect products as radiowaves or can be transferred into the product via one of the numerous cable connections. In most cases, the main cause are power supply cables that absorb all interferences in the grid and direct them into the product, but also data lines can be involved. Indirect lightning strokes that affect the product, are also a test case.

For the standard-compliant examinations of both wire-based and wireless interferences, shielded rooms are necessary. Last year, LOYTEC had constructed a stan-

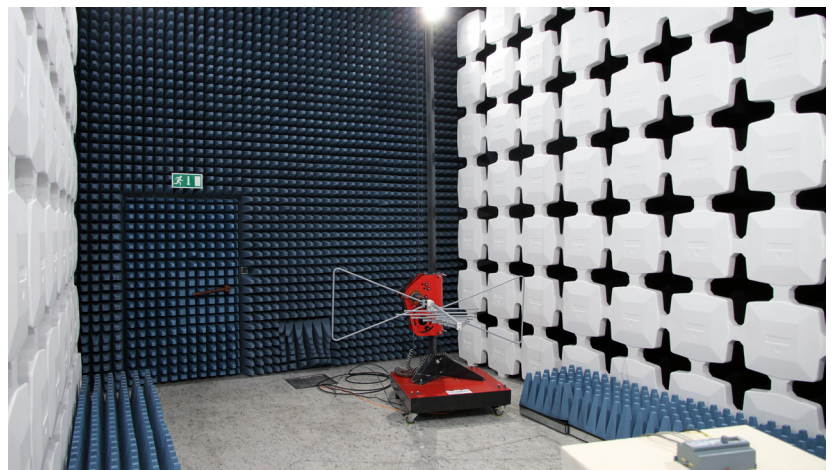For the optical design, the black absorbent cones receive white cover caps that make the measurement engineer's work more pleasant. During new developments one spends days and nights in this "harsh room". Without these white caps, the room would just be covered with black light- and sound-absorbing cones, creating a dark working environment.

The test product is placed on the 360° rotating table and put into operation. The test antenna is mounted at a mast and can be positioned with ground clearance of between 1 m and 4 m. A test receiver records and analyzes all occurring radio signals. In the process, the rotary table is rotated between 0° and 360° and the antenna is positioned at the mast in a height between 1 m and 4 m. The maximum level for each occurring frequency is recorded and has to be below the defined limit. If the maximum is above the limit, it basically means "back to start".

This shielded room is now exclusively available for our own product tests, so that our hardware engineers can conduct their checks and verifications of circuitry changes at any time. The development cycle of new hardware platforms could be reduced substantially through this measure. For you, our dear readers, this means a substantial quality enhancement of our products, and subsequently of your constructed facilities.

The new shielded room is certified for frequencies of up to 30 GHz to examine both today's and also tomorrow's wireless solutions in the GHz frequency range. For performing the measurements, corresponding measuring and testing instruments have been installed. This involves antennas of Schwarzbeck, spectrum analyzer of Agilent (Keysight Technologies), test equipment for the wire-based examination from emtest, and also test adapters of other renowned manufacturers.

Unfortunately, our experience has taught us that despite numerous tests in the laboratory, the operation in a real facility constantly reveals new, not yet discovered phenomena. Indeed, we try hard to consider all possible interferences in our continuous product improvement, but in practice, new fields of application constantly cause new phenomena that need to be tackled. Hence, we are grateful for any feedback on our products. In any case, should a problem occur, it is always our primary objective to resolve the issue in a reasonable amount of time.

dard-compliant shielded room in the in-house test laboratory, surveyed and certified by Seibersdorf Laboratories, the globally recognized accreditation body for shielded rooms.

A shielded room consists of a radio-tight sheet metal enclosure. Steel sheet panels with a conductive sealing tape in between are screwed radio-tightly so that no emissions of radio or cellular transmitters can enter the room and falsify the test result. The inside of the metal enclosure is covered with another layer of steel sheet, on which a wooden panel sheeting is mounted. Ferrite tiles with a size of 100 x 100 mm are screwed onto these panels. For our shielded room, 20,000 ferrite tiles with 20,000 screws were used. Now, absorbent cones are glued on the ferrite tiles. Ferrite tiles and absorbent cones jointly absorb all radio reflections occurring in the shielded room.

Light+Building 2014, Germany

The Light+Building in Frankfurt am Main is a must go for LOYTEC. From March 30 to April 4, we were right in the middle of the ninth edition of the world largest fair for lighting and building technologies. Of course, also LOYTEC management didn't miss this huge event.

Our fair team presented innovations and product solutions at first hand. Also a LOYTEC product novelty was introduced at the fair – the glass L-VIS – the touch panel with frameless glass front, timeless design, and capacitive touch which is available in 7" and 15". The cover story on page 4 tells you more about these high-resolution panels.

This time, the LOYTEC booth appeared in a new and modern design – with certainty one of the fair's eyecatchers. But LOYTEC not only scored points optically, also the interesting conversations and lively discussions with visitors contributed to a successful fair.

We are already looking forward to the next Light+Building!

Ecological Office / Ecological Factory Expo 2014, Japan

From July 16 to July 18 2014, our managing director Hans-Jörg Schweinzer set off to Tokyo in order to attend the Ecological Office / Ecological Factory Expo. The Japanese exhibition focuses on renewable energies and specializes in products and services for buildings and facilities regarding CO_2 reduction, cost cutting, and also energy saving. Obviously, this is the perfect stage for our energy-saving and powerful products. For LOYTEC, it was the first fair experience on the Asian continent, and it was a positive one, throughout. Together with our subsidiary firm LOYTEC Asia, new contacts were established to increase the awareness of LOYTEC in Asia.

ARBS 2014, Australia

As the number one trade fair in Australia, ARBS (Airconditioning, Refrigeration and Building Services Trade Exhibition) is the meeting place for the HVAC and building automation industry every 2 years. Encouraged by the growing demand for LOYTEC solutions in Australia, LOYTEC participated at ARBS 2014 on the Australian continent for the first time.

From May 20-22, 2014 more than 250 exhibitors showcased their products and services in the Melbourne Convention and Exhibition Centre on 13,500 m². LOYTEC took part as one of 35 international exhibiting companies, and as the only Austrian exhibitor. Our expectations were exceeded by far.

A significant large number of customers took the opportunity for a personal appointment. In addition, many initial contacts could be established, partially due to attentive visitors which were seeking discus-

sion with curiosity and competence. Thereby, the entire LOYTEC product portfolio from I/O modules and gateways to touch panels and freely programmable automation stations has spurred a tremendous amount of interest. Remote access via secure IP connections, scalability from a single controller to a whole building automation system spanning across multiple buildings, and also the simple integration of different communication protocols have been topics of great interest for LOYTEC visitors.

In summary, we can say that our contribution at ARBS 2014 is a sustainable one and we were also able to gain many new LOYTEC friends on the 5th continent. Moreover, we would like to thank Glenn Johnston, who supported us with great personal commitment in his function as LOYTEC Competence Partner (Building Control Systems Pty Ltd., Perth, WA) at our booth.

www.loytec.com/eventreview

Competence Partner

This is what EAM stands for:
Good Building Technology is Invisible – But You can Feel it!

While customers and real estate operators, both in the private and public sector, see themselves confronted with challenges arising from diminishing energy resources and rising energy costs, EAM feels challenged to search for new and innovative solutions that guarantee a high level of sustainability.

Bild: Wolfgang Peer und Ing. Jürgen Wolf (v.l.n.r)

The company was founded in 1976 in Graz (Austria) where today about 100 people are employed. EAM already set standards regarding quality at an early stage, with its certification according to ISO 9001.

In the three business areas

- Measurement and Control Technology,
- Safety Technology, and
- Facility Services,

EAM ensures the efficient functioning of buildings for nearly 40 years. With innovative, comprehensive building solutions from individual room control to high-end, the Austrian company EAM, headquartered in Graz and Wiener Neudorf, has become a competent partner for the installation and operation of buildings.

Besides its traditional role as systems integrator, EAM brings in its years of know-how in building automation and supports customers to increase their energy efficiency class for building automation.

Megatrends and building management are getting more and more important for EAM and are becoming the driving force for the corporate culture. Based on these trends that also represent the central drivers of growth, new technologies, environment, and business are central development themes of EAM's innovation management department.

For that purpose, EAM develops, manufactures, and distributes technical equipment including the reqired services. EAM connects with highly qualified partners and thus extends and supplements its competences and resources.

With building management that takes on a central role, EAM is able to control the individual components centrally and optimally harmonized, record the energy balance of every building, react promptly to changed user behavior, and initiate the necessary actions, e.g. the change of an energy provider, on time.

Whether heating or air conditioning, air or water, shading or lighting – EAM technology works hidden in the background. Not visible for anyone, but noticeably for everyone. It ensures a comfortable room and air climate and minimizes energy use.

ABOUT EAM

1976 Foundation of EAM GmbH

1998 Certification according to ISO 9001

2002 Start of research and development activity

2009 Foundation of EAM in Wr. Neudorf

2011 Certification according to ISO 14001

www.eam.at

Raiffeisenbank, Lieboch-Stainz, Austria:
Sustainable and comprehensive renovation of a bank branch, considering ecological, economical, and social aspects.

The basis of creating the draft was the renovation of a 100-year-old building structure based on sustainability criteria. Particular emphasis is laid on a holistic approach from planning, to construction and operation of the building, all the way to disposal. Using a modern, targeted, functional, and high-quality architecture with special focus on sustainability, the aim of an optimal framework for banking operations has been created. These goals have been achieved by a uniform room design with bright rooms in connection with a clear and functional architectural style and the use of newest technological standards in the area of building envelopes and technologies.

The largest challenge for the project participants was to rebuild the old bank building, considering the short construction time of only 8 months and also the townscape protection, to a highly modern, innovative, energy-optimized, and economical building.

Further motives were:

- Increased need for space,
- Replacement of outdated technology for power supply/distribution (oil heating),
- Energy autonomy,
- Damage to the building structure, e.g. desolate truss because of water inlet and rust,
- Modern and timeless appearance in the village with region-wide prestige and image.

In order to meet the requirements of modern bank operations, a complete renovation of the existing building was necessary. Therefore, the bank operations have been moved to a temporary branch office for the duration of the renovation.

To achieve the set goals, EAM was in charge of integrating the following technical building systems:

Heating:

- Bivalent energy supply via air-water heat pump that supplies the building down to an outside temperature of 0 °C. Below, energy is supplied through local biomass heating. This regulation ensures a high power consumption efficiency and degree of utilization of the PV unit and also a high yearly performance factor of the heat pump.

- Energy distribution via radiators, respectively floor and ceiling heating.

Cooling:

- The air-water heat pump is also used for cooling and supplies the silent ceiling cooling and the ventilation system with cold water during the cooling period.

Ventilation:

- The room air-conditioning system has a heat recovery degree, at the required air exchange, of around 70%. The ambient air is pre-cooled with the heat pump in summer and pre-heated in winter. Because of its special design, ventilation also prevents condensation on the cooled ceiling and the 3-pane glass.

Electrical Engineering:

- A PV unit, consisting of HIT cells (Heterojunction with Intrinsic Thin layer), has a high electric power density within a small amount of space. The unit has an output of approximately 10,5 kWp, with annual electrical energy savings of about 9,2 MWh. The rest of the required power is procured from green electricity.

- Recessed and surface ballasts have been installed. Basically, the lighting is controlled by a KNX bus system by means of light-dependent presence detectors for the communal areas and staircases. The outside lighting is controlled by a weather-independent control system and also an individual usage optimization. This safes up to 20% of electrical energy compared to a conventional lighting control system.

- For reducing the cooling load, exterior blinds including a day-light-based control have been installed.

Individual room control:

- Seamless integration of KNX room control devices for recording set point and actual value, lighting control, and exterior blinds. The goal was to guarantee an optimal use of energy with high room comfort and a simple control logic.

Energy monitoring:

- To constantly monitor the efficiency of the taken renovation measures and to ensure qualitative operations, it was decided to implement an energy monitoring system. For that purpose, additional sensors have been installed in individual rooms as well as primary systems. For the measurement of the primary energy (heat/cooling/electric), energy counters based on M-Bus technology have been installed.

Because of the integrative approach in the field of individual room control and the requirements regarding energy monitoring, EAM decided to use LOYTEC LINX-220 Automation
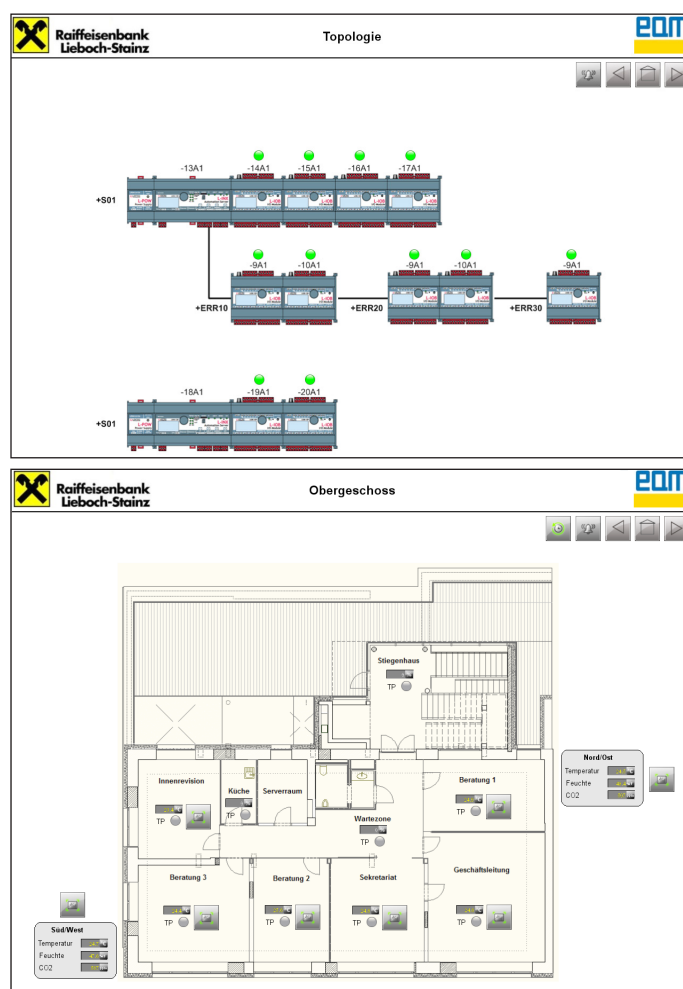
Servers in connection with LWEB-802/LWEB-803 Visualization. This allowed to integrate the different communication systems (BACNET/IP, KNX, M-Bus) in distributed topology on a single platform. Through the integration of the system in the EAM Teleservice remote network and the unrestricted network capability of the LOYTEC automation servers via web services, an optimal service can be provided to the user.

In conclusion, after 1.5 years of operation it can be said that the desired objectives could be reached with the installed solution. The chosen technical integration platform of LOYTEC fulfills the necessary tasks reliably and to the end customer's fullest satisfaction.

The project's key facts:

- Amount of individual room control zones: 18 zones on 1,066 m² usable area,
- Project duration: 8 months,
- Integrated protocols: BACNET/IP, KNX, M-Bus,
- Connectivity: Integration in UMTS/VPN remote network,
- Used LOYTEC technologies: 2 x LINX-220, LWEB-802/803, 6 x LIOB-10x, 5 x LIOB-15x.

LOYTEC's Kitchen ABC

Our chef de cuisine Eugen exclusively lifts his cooking secrets for you. Find here his recipe for a delicious and healthy meal.

Marinated Turkey Skewers with Pea Pilaf & Curry

for 4 persons

Curry sauce:

2 egg yolks
2 tablespoons of applesauce
1/16 l canola oil cold-pressed
1/2 tablespoon of Dijon mustard
A pinch of cayenne pepper, salt
250 g sour cream
2 tablespoons of curry powder
1 tablespoon of rice vinegar

Whisk the yolks, mustard, cayenne, vinegar, salt, curry powder, and oil to a mayonnaise. Mix it with sour cream and applesauce and season with salt. Cover and cool the mixture for about 1 hour.

Pea pilaf:

200 g basmati rice
100 g peas (frozen)
1 onion, finely chopped
1 teaspoon of mustard seeds
2 tablespoons of sliced almonds
2 tablespoons of curcuma
3 tablespoons of sesame oil
1 zucchini, cut in small cubes
1 carrot, cut in small cubes
50 g raisins
Salt, 1 bunch of coriander, chopped

Cook the rice in a pot of boiling salted water until firm to the bite and strain it. Soak the raisins in warm water. Gently roast the mustard seeds in oil until grey (cover the pot, as the mustard seeds begin to bounce). Add the chopped onion, carrot, and zucchini and cook at reduced heat until firm to the bite. Add almonds, peas, raisins, and curcuma, roast them briefly and add the rice. Season with salt and coriander.

Turkey Skewers:

500 g turkey meat, diced
1 red pepper, 1 onion – diced the same size as the meat
1 tablespoon of roasted sesame oil
1 tablespoon of cayenne pepper
Juice of one lemon
2 tablespoons of fish sauce
1 tablespoon of fennel seeds, ground
2 tablespoons of yogurt
Oil for frying

Make a marinade from oil, cayenne, lemon juice, fish sauce, yogurt, and fennel seeds. Marinate the meat and leave it in the fridge for about 3 hours. Put the marinated meat and the vegetables alternately onto skewers, season with salt and fry carefully in a grill or frying pan at medium heat on all sides.
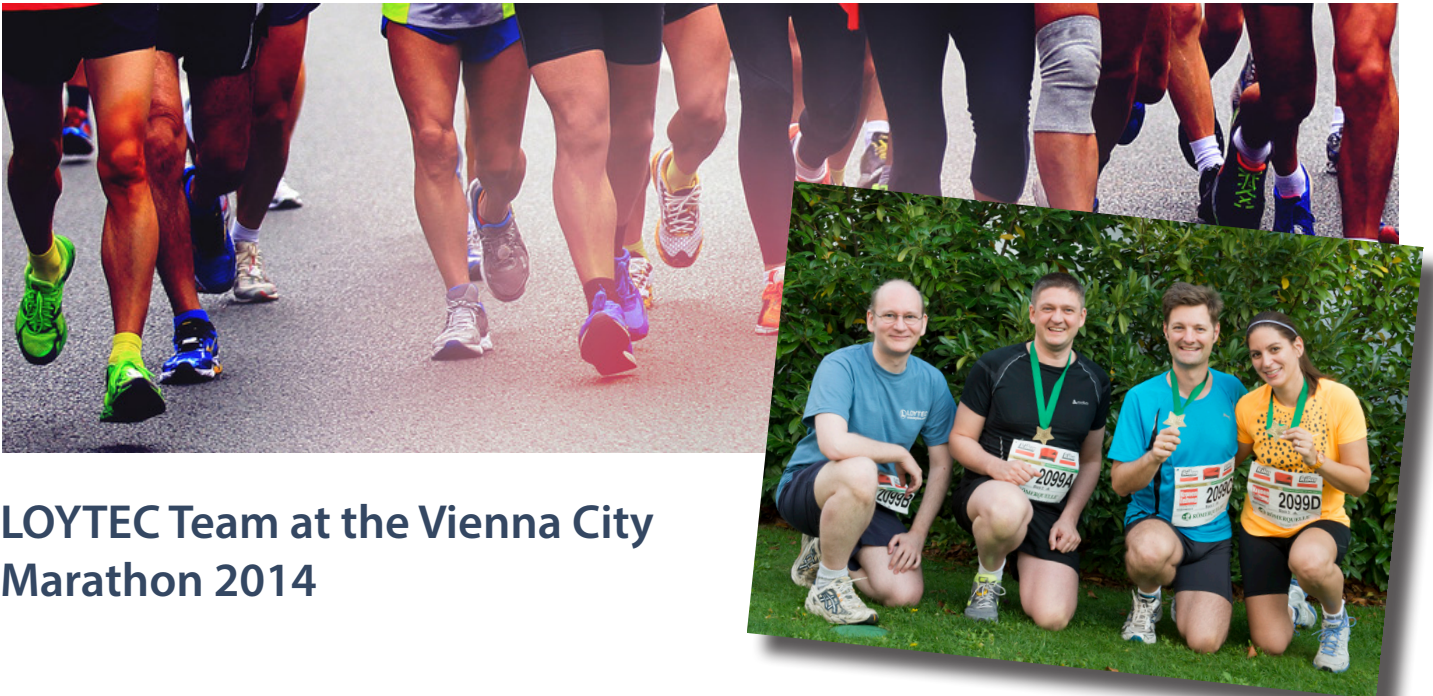
Step 1: marinate the meat
Step 2: prepare the curry sauce
Step 3: prepare the pilaf
Step 4: fry the meat

Bon Appetit!

Keep on running!

LOYTEC Team at the Vienna City Marathon 2014

Technics and sports do not mix! This statement clearly doesn't apply to LOYTEC, at least not since the introduction of the in-house fitness room. Some of our employees recently further refuted this notion with a special sporty challenge: They took part in the Austrian running event of the year, the Vienna City Marathon, on 12th of April 2014. The relay marathon was attempted by Stefan Soucek-Noe, Denise Soucek-Noe, Thomas Pichler, and Thomas Rauscher. They were able to showcase discipline, ambition, and the ability to work in a team – characteristics that also help them in their working life – on a sporting front. L-Express asked Stefan Soucek-Noe for an interview and spoke with him about his hobby, running, and the marathon experience.

L-Express: How did you get started with running?

Stefan Soucek-Noe: Running has been important for me since my time at the university, for relaxation and balance. What's special about it: You can run wherever you want, you don't need a lot of equipment, and you can get started spontaneously.

L-Express: How do you plan your training sessions? Alone or in a group?

Stefan Soucek-Noe: For me, the team experience is especially important, both in competitions and also during the training. The emphasis is on achieving a common goal with friends at work.

L-Express: Where do you get your motivation from?

Stefan Soucek-Noe: Running events, like the Vienna City Marathon, are a special source of motivation. They help to overcome one's weaker self, especially in winter time.

L-Express: Which marathon do you like the most?

Stefan Soucek-Noe: Besides the Wachau Marathon in Lower Austria, the Vienna City Marathon counts among my favorites.

L-Express: Why Vienna City Marathon? What convinced you to participate?

*Stefan Soucek-Noe: T*he Vienna City Marathon was an ideal point of entry to the marathon scene, as it provides the opportunity of participating in a team. The atmosphere along the course and especially the finish are a great experience as one is literally carried over the finishing line by the crowd.

L-Express: Tell us about the marathon itself: How was the weather? How was the result, and how satisfied are you with it?

Stefan Soucek-Noe: This year, the LOYTEC relay team again competed against the four hour bench mark. The weather, with its light drizzle was absolutely perfect in that regard. Altogether, we have been very satisfied with the net time and could even slightly exceed the individual training goals.

L-Express: What is your goal for the next year?

Stefan Soucek-Noe: The large number of participants caused a lot of delay time at the hand-overs. Here, we would like to improve next time. Maybe a LOYTEC flag could help us to better find each other in the marathon crowd, and to crack the four hour bench mark.

Employee Portrait

Dr. Richard Schmalek, Head of Production
"I love it, when everything goes as planned!"

The roaring of the machines, the peeping noises and blinking lights of the devices under test, the shuffling of cartons; all these impressions are received, when the door to the production department of the LOYTEC headquarters opens. But also cleanliness, order, and an outstanding organization characterize the department. This is ensured by Dipl. Ing. Dr. Richard Schmalek, LOYTEC's head of production.

Richard has been working as head of production at LOYTEC since August 2007. Before he came to LOYTEC, he completed his studies at TU (Technical University) Vienna in the field of indus-

trial electronics and control engineering after his school leaving examination. The highlight was receiving a doctorate in engineering sciences. Already during his education he gained practical experience in the course of different internships, e.g. at Kapsch AG and Siemens AG. After that, he was working at the company SEIBOLD as a manager in development, where he was also responsible for production and sales of measuring devices for environmental analysis.

As the LOYTEC head of production, he has been responsible for the production of the entire LOYTEC product spectrum for the last 7 years. The following tasks are part of his job: distributing work packages among his seven employees, setting up machines for the respective products, and also performing product tests and checks. Additionally, the repair of RMA devices lies within his area of responsibilities. As the head of production, he is primarily the main contact person and helping hand in case of problems. Richard particularly values the diverse and multifaceted tasks he is confronted with. Moreover, he loves that the production is carried out in-house. Everything from the printed circuit board to the packed prod-

uct are handled on-site. Per week, a charge of finished products sets off to Wildenhag in Upper Austria, the LOYTEC logistics center, for worldwide shipping.

An event he particularly enjoyed at LOYTEC was the move of the production department into the new company annex under excellent organization. L-Express has already reported about the move in October 2013. Over time, Richard was also able to experience a number of changes up close: The production volume rose substantially, new products were developed, and the products' complexity grew while the individual components became smaller – a true challenge!

For Richard, who describes himself as loyal, precise, and reliable, it is not only important that everything works smoothly in terms of production, also interpersonal relations with his employees are his special concern. He doesn't regard his work as pastime, but rather as his passion. He likes to see that his team is prepared to give more, lends a hand, and works on ideas independently. Management by motivation is high on his agenda: "I would like to evoke a positive attitude. They should be happy about going to work, since it makes up a large part of life!"

www.loytec.com/loytec-inside

Mens sana in corpore sano

"You should pray for a healthy mind in a healthy body"

Many scientific studies confirm that regular sporting activities substantially contribute to health and overall well-being. Another, non-negligible side effect is to get rid of extra kilos that are possibly caused by our excellent in-house restaurant (see L-Express, issue April/2014).

Therefore, LOYTEC set up a fully equipped fitness room that can be used by our employees at any time. Particular emphasis was laid upon the exclusive use of professional studio equipment to guarantee the safety of our employees and also a smooth operation over many years. In total, 15 training devices both for weight and aerobic training are available on over more than 50 square meters. The wide range of dumbbells of up to 40 kg, numerous different benches, barbells with a capacity of up to 220 kg, a squat rack, a multi press machine, and many other devices allow to find the right training equipment for every fitness level.

In order to improve endurance, a rowing ergometer, an exercise bike, and also a cross trainer are available. New employees who are interested in regular trainings get instructed by experienced employees and learn the correct use of the training equipment at no charge. Air conditioning, TV, a locker room, and a shower complete the facilities and ensure pleasant training conditions. The fitness room is just a few steps away from the offices, thus the time spent for more health, power, and endurance can be used efficiently. So let's roll up our sleeves and hit the weights!

LOYTEC Training Schedule

All trainings take place at the LOYTEC headquarters in Vienna, Austria. The training sessions are held by our well experienced trainers. Additional training dates are available on request.

LTRAIN-LINX

Programming the L-INX Automation Server (3 days)

- Configuration of the L-IOB I/O Modules
- Creating IEC 61131-3 applications
- Testing and debugging the application
- Using Alarming, Scheduling, and Trending (AST™)
- Working with LOYTEC Function Library

2014-11-10 (ENG)	2015-01-12 (ENG)	2015-03-16 (ENG)
2014-12-01 (GER)	2015-02-09 (GER)	2015-04-13 (GER)

LTRAIN-BMS

LWEB-900 Building Management System (2 days)

- Introduction to the LWEB-900 System
- LWEB-900 Project Setup
- Working with LWEB-900 Views
- LWEB-900 User Management

2014-11-13 (ENG)	2015-01-15 (ENG)	2015-03-19 (ENG)
2014-12-04 (GER)	2015-02-12 (GER)	2015-04-16 (GER)

LTRAIN-GRAPHICS

Graphical Design for L-VIS and L-WEB (2 days)

- Creating L-VIS and LWEB-803 projects with the L-VIS/L-WEB Configurator
- Creating a distributed visualization based on L-INX and LWEB-803
- Efficient project design using templates

2014-10-20 (GER)	2015-02-16 (GER)	2015-03-23 (ENG)

LTRAIN-DALI

LTRAIN-DALI: Lighting Control with L-DALI (2 days)

- Introduction to DALI
- Features of the LOYTEC DALI Controllers
- Configuring LOYTEC DALI Controllers
- Setting up a DALI network
- Troubleshooting the DALI installation

2014-11-17 (GER)	2015-02-23 (GER)	2015-03-30 (ENG)

LTRAIN-GATEWAY

Gateway Applications and Data Point Management (2 days)
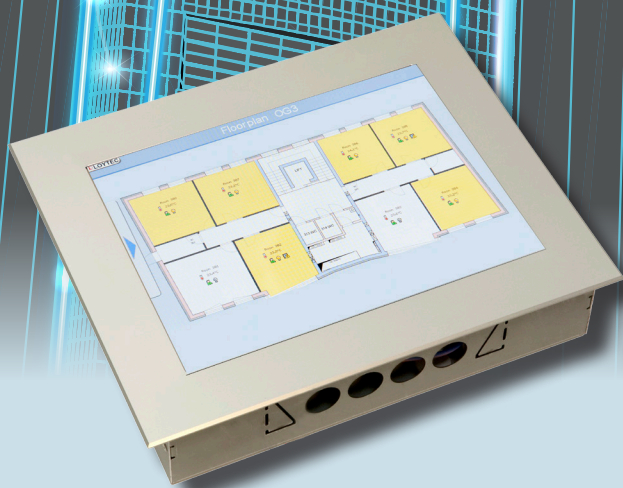
- LOYTEC data point concept
- CEA-709, BACnet, M-Bus, Modbus, OPC XML-DA
- Local and remote AST™ functions
- Building gateway applications with L-GATE, L-Proxy, and L-INX

2014-11-24 (GER)	2015-02-19 (GER)	2015-03-26 (ENG)

www.loytec.com/training