

The Internet of Lighting: download and play!

Interview | Walter Werner interviewed by Michiel de Boer of Moesasji

“It was around 1996 that we at Zumtobel received the first request to connect luminaires to the Internet. Back then it was totally out of reach. It is coming close now,” says Walter Werner. The past three years, Werner led the architecture team of the European research project OpenAIS. “I am happy to say we have created an architecture that allows for various types of lighting control, with each single node connected to the Internet.”

OpenAIS is an EU-co-funded Horizon 2020 research project, aiming at setting the leading standard for inclusion of professional lighting applications into IoT, with a focus on office lighting. The project brings together a strong collaboration of the leading lighting companies Zumtobel, Tridonic, and Philips, and the major players in Internet of Things-technology ARM, NXP and Dynniq (formerly Imtech). Consortium partner Johnson Controls represents the end-user, and academic knowledge on ICT and system architecture is present through TU/e and TNO-ESI.

Control and atmosphere

Werner: “Internet of Things is all about controls and data, whereas lighting is all about providing an environment and atmosphere. Up till today there was no way to bring these worlds together. OpenAIS was tasked to create and showcase that IoT can be used to provide lighting controls in more or less the same quality as heritage lighting controls, adding the benefits of the internet.

We faced quite a challenge. Internet communication is strictly working one-to-one. If you look up a webpage on your cell phone, it talks to a single server. Of course the Internet has many



servers, but the communication is to each individually. With lighting, you want to be able to switch or dim a (large) group of lights at once. To serve lighting best, we had to create group communication that is based on multicast technology. Furthermore we had to cover security, because multicast doesn't support that standardly. We also looked into the negotiation aspect of Internet communications. Again, if you request a webpage on your phone, it will negotiate with the cell tower how to transfer the page (e.g. LTE or 4G) and with the server in what browser and what resolution. Only after this is arranged, the data stream is created to serve the device best. You have to make sure your architecture works on all these levels. So we worked hard to tackle all the aspects and I think we have covered most of them in a very future-oriented and decent way. We have developed an architecture with building blocks that

“I am happy to say we have created an architecture that allows for various types of lighting control, with each single node connected to the Internet.”

allows the vendor to build precisely the application he desires. It is like building a bridge: Is it small or large? How much pillars do you need in between? Or should you make a suspension? The range of applicability is as wide as possible but still the architecture gives the rules to achieve interoperability, making sure that it works in the end, across vendors, and that it provides what you want. I am happy that we were able, with experts of so many different companies, to create a common view and common document for a future-oriented architecture. I think that is unique!”

Enabler

Are we ready then for the Internet of Lighting? Werner: “We are progressing steadily. The architecture is published, as well as a database with examples on how to use it. This is open to the

public. But in the end we will have to see, if, and when the market, the lighting community, will pick it up. Our approach and architecture have to gain awareness and recognition first. In January 2018 we will showcase our demonstrator. In the Witte Dame in Eindhoven we will feature a project of considerable scale: Some 400 luminaires and 400 sensors, all together more than 1200 functional points, will be controlled in multiple groups over the internet. It is a decent large deployment of both wired and wireless connections, working seamlessly together, including building management integration. The functionality will be alike to what heritage lighting control can do: scenes, switching, dimming and regulations, but strictly based on internet communication to the final node.”

Play

What will change by IoT? Werner: “The main development I see is, we can disconnect controls, business and development from the luminaires business. Let me clarify: If I was an engineer that wanted to develop a very specific kind of control, for example a system that follows persons with a spot light, this would be a very specific case for a lighting manufacturer. They rather focus on standard hard- and software, that is industrially efficient, easy to install, to maintain and so on. Today, you are either large enough to build, market and sell your own complete system, or you can forget it. But with IoT you could sell the controls algorithms only, and this way add a specific expertise to the standard offer. You can make it available on top of existing luminaires, you can even place your controls in the cloud and connect them to all systems that are interested in using it. That's what Internet provides. Today's lock-in into larger organizations or standardized technology is gone. IoT provides a completely different way of achieving variety in lighting systems, and it surely will boost ideas we can't even think of at this moment. We will have an AppStore for lighting controls in the future. Just download and play!”