

Spotlight on IP – Discover the new possibilities in lighting systems

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Spotlight on IP – Discover the new possibilities in lighting systems

The ARRI Solutions Group has recently completed an innovative lighting systems design and integration project at broadcaster WeltN24's two studio spaces in the architecturally stunning new Axel Springer building. Located in Berlin's lively Kreuzberg district, this state-of-the-art facility recently opened for business.

The design and implementation requirements - defined by WeltN24 - were for an end-to-end IP infrastructure to provide future-proof lighting fixture control that was integrated into the studios' central broadcast automation.

IP networking all the way to the lights in a broadcast studio is currently a unique concept worldwide!

Primary project requirements:

- 24/7 live broadcasting
- 1-person operation without needing dedicated lighting engineers
- Integration of the lighting system into the central broadcast automation
- Remote operation and service - for short conversion / setup times
- Use of IP-based and non-proprietary protocols wherever possible
- The virtualization of hardware components where possible



When tried-and-tested ... is just old

DMX is central to any discussion about lighting systems networking. This digital protocol revolutionized lighting control technology in the 1980s, which since then has been based on 512 channels that can be transmitted stably, but at a low data rate over long distances.

RDM protocol was added later as a feedback channel, but this only allows limited configurations and status requests, and has the major disadvantage of both reducing the DMX data rate and affecting the stability of the DMX signal.

With the development of Art-Net, sACN and other DMX-over-Ethernet protocols, it is also possible to transmit DMX over standard Ethernet. However, experience shows that the signal is still transmitted as DMX for most of the route, so the advantages of IP only apply to a limited extent and across a short distance of the network.

Moreover, lighting systems require specialist knowledge to be managed, and protocols like SNMP, which are already standard in other broadcast disciplines like video and audio, cannot be used.

An end-to-end IP connection makes it possible to comprehensively configure the lighting fixtures remotely and to perform real time troubleshooting quicker and easier, and it was this specification that drove the WeltN24 studios' specification of lighting fixtures, a combination of ARRI SkyPanels with Robe's T1 Fresnel moving lights. Both types of luminaires offer an integrated Ethernet interface that facilitates control of the fixtures via web-based interfaces.



Interdisciplinary operating concepts

The past broadcasting trend has been to have dedicated operators in charge of their specialist technical areas during a show.

However new and improved technologies mean broadcasters can now move towards less operators covering multiple specialist areas simultaneously. In addition to the lighting desk, for example, the operator may also be responsible for image technology, sound, and camera robotics.

The concept of 'broadcast automation', which is also used at WeltN24, goes one step further. Here, especially for the news telecasts, all elements of the broadcast sequences are precisely pre-programmed with the operator starting the show and only minimally intervening or adjusting as necessary.



System-wide redundancy concepts

Using conventional networking methodology, redundancy concepts can be standardized and simplified. Protocols like link aggregation and RSTP (Rapid Spanning Tree Protocol) provide secure ways to network devices and ensure continuous data transmission should an individual link fail.

Unlike proprietary network components, standard components like network switches can be equipped with a second power supply unit to continue operation in the event of a failure. The advantage of using standard network components – in addition to the available technologies and redundancy components – is that no dedicated knowledge is required for administration. It is and remains IT – regardless of what „hangs on the back“.

Standard network components are also predominantly used at WeltN24. The network switches are coupled in a ring topology using RSTP and connected to the „yellow network“ (central management network) via link aggregation. For an additional fail-safe, they are also connected to and powered by, a fully redundant power supply.



Resource-efficient system integration

Intelligent networking allows resources to be allocated more efficiently and hardware can be utilized for different applications simultaneously, so it is becoming increasingly unnecessary to use dedicated - or any - hardware at all.

‘Virtualization’ is a key buzzword! Virtual machines can be set up to deal with different applications and their respective requirements, and to run on large server clusters that distribute the work / total load evenly via intelligent allocation.

Another major advantage is failure safety. Operations can continue even if one or more servers fail. Virtualization additionally enables applications to be accessed from any point on the network - and these do not have to be connected individually or in a location-dependent manner.

This efficient use of resources minimizes unused hardware potential and can be easily and flexibly scaled up as needed. WeltN24 benefits from this technology by allowing the virtual service computers distributed throughout the buildings to access and operate the lighting control desk in the network racks as ‘clients’, reducing the need for costly networking and maintenance on local desktop PCs.

Workflow automation

'Workflow automation' is the synchronization of individual components to achieve an orchestrated overall system, especially in news studios when broadcast recurring sequences are ideally suited to being automated.

The networking of all broadcasting technical elements, including the lighting system, makes it possible to maintain central control, either by triggering proprietary components or through direct IP control of the end devices.

Running a show in which all disciplines - including sound, lighting, video, and camera robotics - are pre-programmed reduces user errors and allows these devices to be synchronized for creativity and efficiency.

At WeltN24, the broadcast automation triggers pre-programmed lighting scenes in the lighting control desk via MIDI. A conventional lighting control console is only necessary for the setup and programming stages of the operation.



Central system monitoring

In addition to comprehensive networking, centralization and fail-safes are important for any broadcasting scenario.

Central monitoring reduces personnel costs and increases the stability of the entire system. Errors can be corrected before they affect operations, and bottlenecks can be identified and eliminated faster.



However, some catching up is needed in terms of lighting systems. Lighting system-specific devices that communicate their status via standardized interfaces such as SNMP are barely represented. Status data can be retrieved via RDM, but this can also lead to destabilization of the DMX signal – as mentioned earlier.

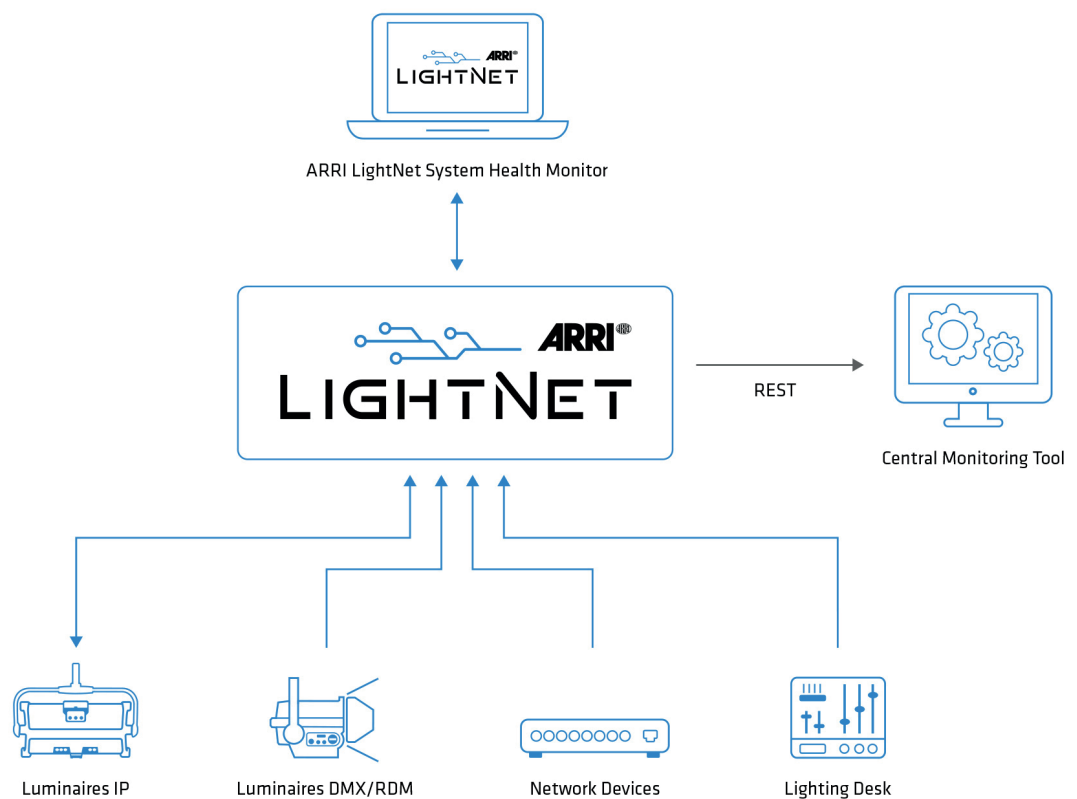
An end-to-end IP connection can partially solve this issue. The use of ArtRDM, i.e., RDM over a network – does not lead to the bandwidth problems and destabilization associated with the conventional DMX signal. It also makes it possible to use standard network monitoring and diagnostic tools e.g., accessibility checks via ping.

ARRI LightNet integration

To use the full power of IP connectivity but making the designed lighting system, its usage and operation and daily studio workflows as easy as possible at the same time, ARRI developed ARRI LightNet.

ARRI LightNet is a software platform to offer smart, logical, and at-a-glance centralized monitoring, fault-finding, and management of broadcast studio lighting networks from anywhere.

Monitoring at a glance



This intelligent and innovative tool enables broadcast facilities such as WeltN24 to streamline the monitoring of their lighting network in one robust platform. As remote, decentralized, and socially distanced working becomes more popular and established, ARRI LightNet leads the way for essential, comprehensive, user-friendly monitoring of lighting networks. ARRI LightNet observes and shows all elements across a broadcast studio lighting network—luminaires, consoles, network switches, splitters, nodes, etc.—displaying all the relevant data in real-time on a single interface. This allows for users and technicians to work harmoniously in parallel while accessing and managing different aspects of the network.

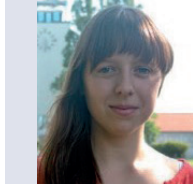


Summary

IP was the only scenario to solve WeltN24's high level requirements. IP unites the various broadcast specialist areas making them flexible and more resource efficient. This is the first time that lighting technology has been able to match the integration capabilities of AV disciplines.

So let there be light!

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Imprint

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Cover
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