



Reference

Wi-Fi 6 at BUGA 23: playground for the new WLAN standard

"Attention, attention, ..." – Frey Austria has turned the information and communication system of the aerial cable car at the German National Garden Show Mannheim 2023 into a pilot for a first "armed" Wi-Fi 6 application. The latest SCALANCE IWLAN technology from Siemens using the new standard makes the solution easy, robust, and reliable. Not only is the operator satisfied, the automation expert is confident they can continue using the technology to implement demanding real-time and safety tasks with the accustomed speed and efficiency.

Highlights of the solution

- High-performance and reliable WLAN communication based on the latest standard
- Cost and space savings thanks to integrated manageable 4-port switch
- Easy serial integration and commissioning thanks to CLP
- Easy setup and fine-tuning of individual devices thanks to intuitive diagnostics

It is not only the geographical high point of the German National Garden Show Mannheim 2023: the aerial cable car ride from Luisenpark over the Neckar River to Spinelli Park and back impresses on many levels. The ride of about two kilometers from one exhibition park to the other gives visitors a magnificent view of the city and the floral and other highlights of the garden show. One highlight of a technical nature is ever-present along the route: an Industrial Wireless LAN (IWLAN) based on the latest wireless communication standard. Under favorable circumstances, it goes unnoticed since it only plays digital voice messages in each of the 64 cars when required to inform and guide guests. Such a system for spoken messages is mandated by regulation due to the distances of up to 400 m between the cable car support towers. For this reason, a WLAN-based voice-over-IP solution was implemented. The wireless network is also used to communicate information on the car lighting function. Since the network is relevant for safety, it must be stable and available at all times along the route. In addition, gaps in communication with the cars at the handover points are not permitted. Up to 2,800 visitors per hour in each direction can be safely transported on the monocabable cable car in this way.

Selected by experienced automation professionals

Frey Austria GmbH in Innsbruck, Austria, which specializes in this type of application, has overseen and automated more than 700 aerial cable car systems across Europe. The core competencies of the Austrian firm include electrical equipping, modification, expansion, and retrofitting of cable car systems of almost every type. The portfolio comprises a broad range of electrical drive, automation, and visualization solutions as well as system engineering (hardware and software) for drag lifts, aerial cable cars, funiculars, gondola lifts, and chairlifts. The company has served in this profession for decades and has been a Siemens Solution Partner for aerial cable car applications since 2015. As a result, employees are highly skilled in handling SIMATIC automation technology, SINAMICS drives, and SCALANCE IWLAN technology as well as the associated Siemens software tools.



A monocabable cable car of two kilometers connects the two main parks of BUGA 23. The latest SCALANCE IWLAN technology from Siemens using the new Wi-Fi 6 standard ensures gap-free communication with the 64 cars.

BUGA 23, which runs from 14 April to 8 October 2023, is a summer festival, flower show, and experimental field all in one – the latter also with a view to innovative mobility concepts for the future. Such quiet, space-saving, and cost-efficient aerial cable car systems are a promising prospect for metropolitan areas around the world. Frey Austria made use of the latest IWLAN infrastructure when implementing the aerial cable car installation. The clearly defined scope of the project made it ideal for the first practical trial of the latest WLAN standard Wi-Fi 6 (IEEE 802.11ax). “Perfect for taking a gradual and careful approach and for testing the possibilities of the first available components under real conditions,” states Wolfgang Kofler, Executive and Sales Manager at Frey Austria.

Robust Wi-Fi 6 along the route

The IWLAN relies on 13 SCALANCE WAM763-1 access points located on the two terminal stations and the ten support towers on the route. Mounted in each of the 64 cars is an identical controller bundle centered around a SCALANCE WUM763-1 IWLAN client module. With its integrated 4-port switch (RJ45 with 10/100/1000 Mbps), this module eliminates the need for the equivalent number of separate switches, thereby reducing costs and time-consuming installation and configuration. The compact design, simple wall mounting (preferred over rail mounting in this case), and easily accessible connections/ports save installation space

and make connection work less tedious. The external SCALANCE ANT795-6DC antennas are led to the outside by means of antenna cables.

Continuity guaranteed – effort saved

The engineers from Innsbruck appreciate the familiar look and feel of the new SCALANCE W700 device generation. "Everything is where you expect it to be, and we did not require a long training period," says Friedrich Kecht, engineer and WLAN specialist at Frey Austria. An indispensable tool is the proven signal recorder of the IWLAN clients, which greatly simplified the task of setting up and fine-tuning the individual devices. "To do this, we ride the route, record the signals between the clients and access points, and make selective adjustments as needed. All this is done via the web-based management (WBM) interface of the devices and thus without additional software or equipment."

During commissioning, the Austrian engineers dug deep into the Siemens bag of tricks, making use of the recipe management feature of the SIMATIC S7-1200 controllers for series commissioning. This allowed them to create the program once and then load it onto all the controllers. The configuration of IWLAN clients was also essentially performed only once and then transferred to the other devices using the CLP (Configuration and License PLUG) removable data storage medium. Clients could be assigned unique IP addresses from

the DHCP server based on their MAC address, and commissioning of the overall installation ran smoothly. Advantage of using a CLP for each client during commissioning: because the latest configuration is automatically stored on the removable data storage medium, operation can resume immediately after a device replacement simply by plugging in the CLP. As is often the case when using new components, a few small adjustments were required over the course of the project, "which were quickly implemented jointly with Siemens", explains Yannic Königsberger, Project Manager at Frey Austria.

Ideally suited for real-time and safety tasks

The next major aerial cable car project is coming up and the specialists from Frey Austria face a new challenge. For the first time, they must implement time-critical safety-relevant tasks using Wi-Fi 6. The industrial Point Coordination Function iPCF-2 of the new SCALANCE W devices makes them ideally suited for this. Of particular interest to the automation specialist is the use of TCP Event Roaming for aerial cable cars. It allows the timing of the hand-over from one access point to the next to be selectively controlled externally. Still available is the usual automatic identification of a new access point based on signal strength and other parameters. While in operation, the aerial cable cars can become obstacles in the radio field and cause bad roaming decisions. In the worst case, operation can be impaired. "By contrast, with TCP Event Roaming, reproducible roaming times of less than 50 ms are achievable, which makes implementation of safety-relevant tasks much easier," explains Wolfgang Kofler. "This feature has long been at the top of our wish list."

Saving energy in sleep mode

In applications where prolonged planned or unplanned downtimes are possible, the Siemens IWLAN clients have an advantage, according to the engineers from Frey Austria. By taking advantage of the digital input/output interface and sleep mode feature of the client, they can remotely switch components that are connected to the client and put the client itself into energy-saving idle state. This is decidedly more flexible and convenient than a customary time-/contact-controlled



Guests receive information from the central control room when required via IWLAN and voice-over-IP messages.

Security information

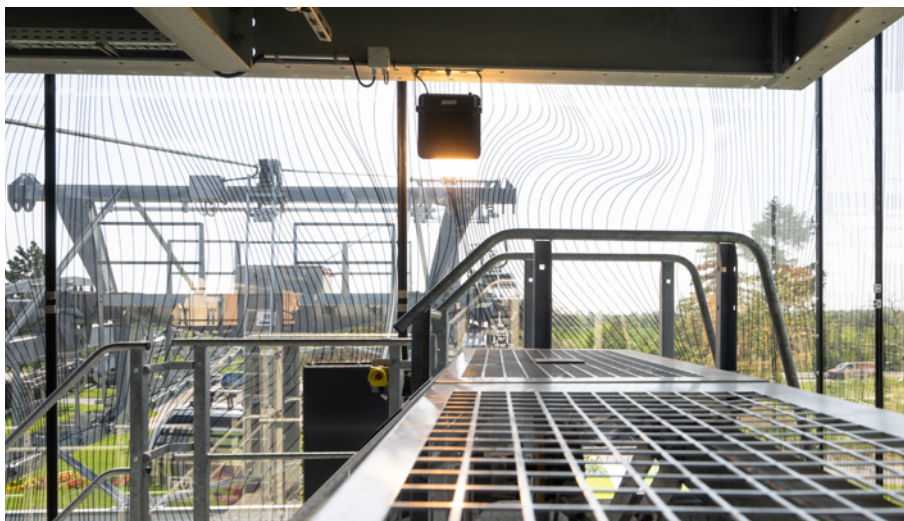
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The IWLAN relies on 13 SCALANCE WAM763-1 access points (top center) located on the two terminal stations and the ten support towers on the route.

shutdown. Systems can be switched off for prolonged downtimes and quickly restarted after operational interruptions caused by thunderstorms, for example. That conserves battery power and/or reduces charging cycles and wait times.

New standard

The Wi-Fi 6 installation at the German National Garden Show Mannheim 2023 came at just the right time for the aerial cable car specialists from Frey Austria. "We were able to extensively test the new SCALANCE devices in practice. We are completely satisfied with the results and have experienced no problems to date. The stability, features, reaction times, ease of use, and Siemens support have fulfilled all our expectations." With the new SCALANCE Wi-Fi 6 components, the Siemens Solution Partner considers itself optimally prepared for the future. It has found its new standard.