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SUSTAINABLE NETWORKS FOR LARGE PUBLIC VENUES

SPORTS VENUES ARE GOING GREEN

As the global reach of sports continues to grow exponentially, so does the environmental footprint of the industry. The level of exposure that sporting events offer, and the enormous audiences they attract, can undoubtedly be used as a tool for positive change. Sporting venues and stadium arenas around the world have joined the sustainability movement to protect the environment. Trending are newly constructed or renovated venues with a goal of being net-zero and carbon emission-free venues. In the United States, there are 300 members of the Green Sports Alliance and 130 venues leveraging the cultural and market influence of sports promoting ambitious actions on environmental and social issues across teams, leagues and venues.

NEW NETWORKS PRESENT HIDDEN SUSTAINABILITY OPPORTUNITIES

At the same time, these venues are racing to improve their network capacity to meet guest demand for data increasing at a rate of 67 percent per year. As a result, a unique opportunity presents itself to deliver greater network performance and at the same time reduce the overall power and cooling consumption by capitalizing on new technology advances and deployment models.

As sustainability initiatives gather steam in large public venues (LPVs), IT teams are being asked to find ways to contribute to their organizations' decarbonization efforts. Some are unsure what measures to take to make a difference. Though they may not realize it, those planning to upgrade their networks can reduce the power and cooling utilization by up to 55 percent—and cabling materials used for network modernization by up to 89 percent. For example, as networks are modernized, they can capitalize on all-digital 5G distributed antenna system (DAS) technology advances to shrink their wireless network equipment footprints and slash in-building wireless power and cooling consumption. The result is a venue that has a network with greater speed for fans and is more sustainable for our environment.

RETHINKING CONNECTIVITY AND ENVIRONMENTAL IMPACT

Today's large venue networks will power tomorrow's touchless, cashless, and ticketless interactions. The challenge is to stay one step ahead of the changes that are coming—along with doing it in a way that keeps an eye on the environment and greenhouse gas (GHG) emissions.

The next generation of networks will need to be digital, streamlined, modular, and adaptable—specifically designed for tomorrow's hyperconnected venues. The result is a simplified, scalable network that can dramatically reduce time, cost, and complexity while being more sustainable through:

SIMPLIFYING TO ENABLE FASTER DESIGN AND INSTALLATION AND DRIVE MORE EFFICIENCY

LEVERAGING ALL-DIGITAL ARCHITECTURE AND SOFTWARE TO STREAMLINE 5G CONNECTIVITY

EASILY SCALING AND RECONFIGURING TO SUPPORT NETWORK GROWTH

DRIVING A MORE EFFICIENT AND MANAGEABLE INFRASTRUCTURE THROUGH WIDE-SCALE NETWORK CONVERGENCE

REQUIRING LESS EQUIPMENT AND MATERIALS TO ENABLE LOWER POWER, COOLING, AND SPACE UTILIZATION

Meeting these challenges requires us to rethink how connectivity is delivered throughout the venue; how new technologies and systems are deployed, onboarded and managed; and the overall impact on the venue and the environment. Questions like these provide the raw material for new all-digital systems and innovative infrastructure platforms that are conceived and built for what's coming.

A STRATEGY FOR CONNECTIVITY AND SUSTAINABILITY

For any LPV environment, efficient connectivity that minimizes CO^2 emissions depends on an informed strategy and an integrated design and deployment approach. The temptation is to regard technology procurement and design separate from the overall sustainability goals as a series of distinct challenges, such as wireless DAS, fiber, and copper connectivity versus the overall LPV sustainability goals. However, dealing with these challenges individually invites inefficiency. Where vital efficiency gains can be diminished—or even reversed—by isolating these design decisions, a lack of asset optimization and even waste of facilities infrastructure can occur. To be effective and optimize the overall objectives of the venue, the strategy for connectivity and sustainability should be:

COMPREHENSIVE

The strategy must emphasize both connectivity and sustainability needs—starting with optimized digital systems that have low power consumption in a smaller form factor, then leveraging a common robust fiber and copper infrastructure for all systems, including DAS. Taking this approach with a state-of-the-art single multi-access network can result in substantial savings through increased design velocity and reduced power, cooling, space, material, labor, and maintenance costs.

SIMPLE

Complexity is a hidden (but enduring) cost and hidden burden for a sustainable venue. Done well, a deployment will take advantage of lower power, smaller footprints, and streamlined architectures to drive sustainability and cost-saving opportunities. For example, using all-digital DAS systems (rather than analog systems) and modular designs can realize power and cooling savings up to 55 percent and space savings up to 88 percent. Also, using preterminated cables and the capacity to share multiple services across a converged physical infrastructure can reduce labor and materials costs up to 20 percent.

FLEXIBLE

While each LPV deployment is unique, all LPVs need the flexibility to move services and add new services quickly and simply to maximize performance and sustainability as the needs of the venue change. An all-digital architecture with a common robust infrastructure will help your network support the latest technologies and applications, from LTE to 5G and IoT to keep your venue on the leading edge of guest experience and sustainability.

EFFICIENT

Automation through software and analytics drives efficiency and reduces hardware components and resources required to enable high availability, capacity allocation, and efficiency across the venue network. This platform can play a key role with supporting overall operations, compliance, growth and sustainability initiatives.

AN INDUSTRY IN TRANSITION TO 5G

For sporting venues that serve the public—as well as associated airports and hotels—delivering reliable mobile communications to densely packed crowds has become competitive table stakes. As the world's mobile network operators ramp up their 5G macro network rollouts, 5G is also becoming the gold standard that venue visitors expect for watching sports replays, ordering concessions and merchandise, accessing travel information, and countless other types of dynamic communication.

Venues and mobile network operators heavily invest in DAS infrastructure to improve cellular performance. An extensive cabled network of RF antennas and equipment throughout the venue repeats and/or amplifies cellular signals from licensed macro networks to reach highly distributed visitors, employees, and vendors. But, while DAS is a pivotal technology for immersive guest experiences, most existing installations are no longer as efficient as they could be.

Conventional deployments require specialized equipment to perform analog-to-digital-to-analog conversions along the network path between each mobile carrier's cellular signal source and the venue's distributed antennas. This equipment consumes significant power, cooling, and real estate—using up to 55 percent more energy than an all-digital system.

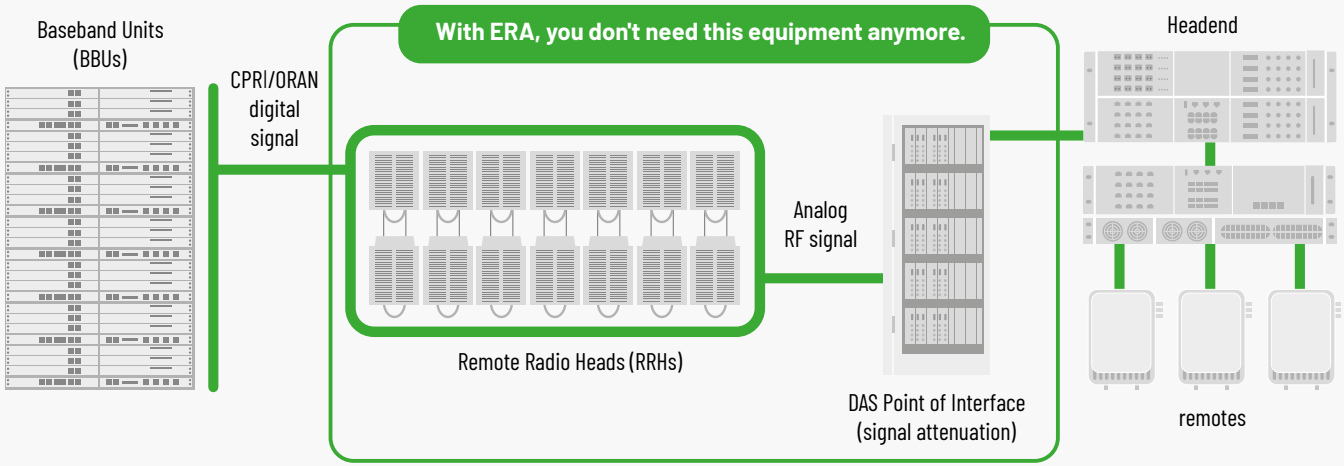
THE EFFICIENCIES OF GOING DIGITAL

Enter the digital DAS, which collapses analog-digital conversions into simple digital interfaces that eliminate large volumes of head-end radio equipment. These systems can free up as much as 90 percent of floor space—which venues can redeploy and monetize—and reduce DAS energy consumption and cooling power by at least half. Moreover, the digital DAS replaces multiple coaxial cable runs used to connect analog DAS components with standard singlemode fiber, reducing cabling up to 89 percent throughout the venue.

The sustainability impact of digital DAS can be seen in the NFL's largest stadium, which was reaching the performance limits of its conventional in-building system around the time the pandemic hit. The Dallas Cowboys' AT&T Stadium chose to deploy a digital DAS during the 2020 lockdown to support new gigabit-speed 5G in-building coverage.

While it wasn't focused on sustainability at the time, the stadium ended up with a win-win, according to Matt Messick, Dallas Cowboys CIO. "We increased in-building network performance 10-fold, with a second-to-none performance experience for fans," he said. At the same time, the stadium reduced power consumption by about 87 percent and cooling consumption by about 75 percent—equating to over 100 metric tons in CO2 emissions savings per year.*

For example, the stadium needed only five equipment racks, in contrast to the 30 to 40 racks required for an analog DAS—a reduction of about 88 percent. The stadium got back 5,000 square feet of space that it can now monetize in new ways.



The above figure shows the architecture for a traditional analog DAS system highlighting the remote radio heads (RRHs) in the middle that are eliminated with a digital DAS system. Through a collaboration with Nokia, ERA® features a direct CPRI Digital Donor (CDD) interface to Nokia's AirScale baseband unit (BBU). This integration collapses the functionality of up to six remote radio units and their associated cabling into a single 300 x 145 mm (12 x 6 inch) card. Head-end space and power consumption are drastically reduced while system capacity is increased.

ENABLING A SUSTAINABLE FUTURE IN SPORTS ENTERTAINMENT

Many sports organizations are challenged to achieve conservation and sustainability objectives that range from alleviating the environmental effects of greenhouse gases to attaining the cost, operational, and real estate efficiencies their venues need to remain viable into the future. Together, these forces are causing venue owners to rethink the way networks are designed and deployed while considering the impact on the environment. A transformational approach is needed that considers new design processes using digital technologies and software that prioritizes sustainability and reduced energy consumption during their "use" phase. Doing this facilitates one of the most significant opportunities for environmental impact. Conventional technologies and deployment models that consume greater resources are less efficient than newer digital infrastructures that collapse functions into fewer devices and require less floor space and energy.

ANDREW has a clear vision and roadmap for the development of more sustainable LPVs with wireless grounded in quantifiable savings. We are enabling venue owners, operators, and service providers opportunities to realize significant improvements in both energy consumption and GHG emissions, thanks to continuous innovation in our product lines, the development of smarter material, and sustainable engineering processes. We're helping our customers improve efficiencies, effectiveness and outcomes while maintaining our strong focus on enabling a sustainable future in sports.

MORE INFORMATION

LARGE PUBLIC VENUES

NOTES

The comparison models are an indicative representation of a ANDREW Digital ERA DAS system and an ION-B analog DAS system.

*Carbon footprint impact values were calculated using the U.S. Environmental Protection Agency (EPA) Greenhouse Gas Equivalencies Calculator available at https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator#results

Since 1937, ANDREW, an Amphenol company, has driven the evolution of wireless technology. Trusted by mobile network operators and enterprises globally, we work closely with our customers to deliver innovative solutions that enhance connectivity experiences both outdoors and indoors. Our dedicated global team is committed to advancing the industry, fueled by the vision that a better-connected future is possible.

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