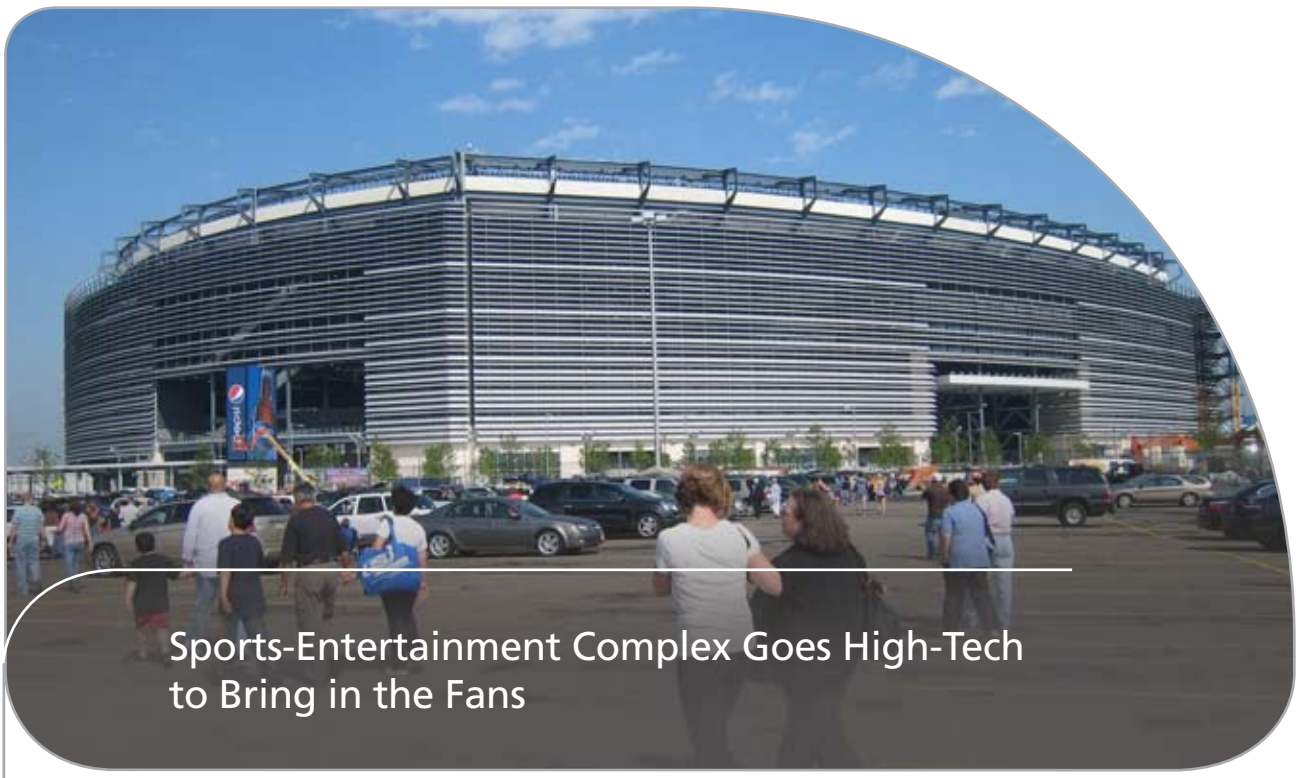

Sports-Entertainment Complex Goes High-Tech to Bring in the Fans

Photo by: Deodato Pangandoyon

CASE STUDY

The New Meadowlands Stadium in East Rutherford, N.J. is many things, not least of which is home to two National Football League teams, the New York Giants and the New York Jets. It is brand-new, having opened in April 2010 not with a football game but a lacrosse match, and it is huge, occupying two million square feet of land and twice the size of the former Giants Stadium. In terms of seating capacity, it is the nation's third-largest NFL stadium, behind the Cowboys Stadium in Dallas and the FedEx Field in Washington, D.C. Yet when it comes to technology, the New Meadowlands Stadium is in a league of its own.

The Jets and the Giants, in a 50/50 partnership that built the $1.7-billion stadium, invested a reported $100 million in technology. The result is one of the most high-tech, open-air sports and entertainment venues on the planet, and ADC's integrated solutions support all facets of the stadium's communications network. With this customized communications network that runs on a mix of optical fiber, copper and wireless technologies, the New Meadowlands Stadium boasts an array of audio-visual splendors, including:

- 20 high-definition (HD) video boards, ranging in height from 20 feet to 60 feet, surrounding the stadium
- A 48-inch x 2,200-foot LED ribbon board encircling the interior bowl
- Four HD video display boards--one in each corner of the stadium, with each board measuring 30 feet high and 118 feet wide, for a total of 14,000 square feet of HD viewing
- More than 2,200 HD IPTV monitors, adding up to 48,000 square feet of screens, at certain seats throughout the stadium
- A wireless system that provides ample capacity and coverage both within the stadium and across the surrounding parking lots for fans' wireless devices, ranging from 2G cellphones to 3G/4G smartphones

The wireless system makes the New Meadowlands Stadium an intelligent complex, allowing fans to download smartphone applications which will, among other things, identify concession stands with the shortest lines; help parents locate lost children, if their kids are wearing special bracelets; and determine which parking lots have available spaces.

How Can a Stadium Compete with Multimedia at Home?

Professional sports are, as everyone knows, not just about games but about big business, too. As such, stadiums around the country face increasingly stiff competition from all the flat-screen HD TVs and computers with streaming video which fans use at home to watch sports.

Hoping to fight technology with technology, sports organizations are installing huge video displays and smartphone applications in an effort to attract more fans into their stadiums. Reporting on a meeting of NFL team owners in March 2010, *USA Today* quoted New York Jets owner Woody Johnson as saying, "You've got to constantly nurture the in-stadium fan experience because the technology at home is getting so vast and amazing, fans might prefer to stay home."

A Broadcast Solution Lets Fans See Whatever They Want

As one of the systems integrators for the New Meadowlands Stadium technology, Diversified Systems of Kenilworth, N.J. designed, engineered and installed the video replay room and video headend equipment. In addition, Diversified Systems was responsible for the rollout and deployment of the Cisco® Digital Media Players (DMPs). Project logistics manager Myron Dubb says eight people from his firm worked for three months to put everything in place, dividing the project into three phases:

- The deployment and installation of the digital media players
- The design and installation of the video headend racks, which take in all the on-air broadcast and off-air satellite signals and distribute them, via the VoIP network to the digital media players that are connected to the 2,200-plus TVs throughout the stadium
- The design and installation of the video replay room

Diversified Systems built next to the video headend room a video distribution center, Dubb explains, which distributes the satellite video feeds and owner-supplied content to all of the local and small TVs in the suites, restaurants, clubs and concourses, as well as the large screens. As a result, fans in their seats, along with those in the suites, restaurants and clubs, can see end-zone game action and, via the Red Zone channel on the NFL Network, re-plays of other NFL games as well. Depending on their access rights, fans in the suites can select any of the channels that are being broadcast throughout the stadium.

Diversified Systems selected ADC's broadcast equipment to provide audio and HD-video communications support for the four huge video screens and for the editing suites where coaches can review plays, edit video and prepare players for upcoming games. Dubb says Diversified Systems has a long history with ADC, "in terms of the installations we've done, the products have always been of the highest quality. We also know there's a lot of [support] backup with ADC, should anything go wrong."

The specific broadcast equipment deployed by Diversified Systems includes ADC's ProPatch® audio and video patching systems and jack fields, as well as its HD bulkhead and cable-terminated BNC connectors. In addition, the company's team installed ADC's FL2000 fiber optic patch panels to interface the equipment with the stadium's fiber backbone network.

Next Comes the Connectivity and Cabling Solutions

BN Systems of Orchard Park, N.Y. holds a master service agreement with AT&T, and that team won the bid to put in the cabling infrastructure. Mark Rewers, BN Systems vice president of operations, says his team of approximately 100 people installed:

- About 250,000 feet of multimode and single-mode fiber-optic cable
- Nearly 2.5 million feet of Cat 6A twisted-pair cable, including about 8,600 drop cables
- Nearly 100,000 feet of Cat 3 and Cat 5E cable for voice connectivity; and 63 telecom closets and one master closet

Because of concerns about possible interference from nearby radio towers, the architectural and consulting firms designing the stadium had specified shielded cabling. However, as an ADC reseller, BN Systems alerted ADC to the potential stadium opportunity, and ADC subsequently funded an independent study which demonstrated that shielded cabling was not necessary. As a result, Rewers says, "We saved the stadium money right from the beginning" and subsequently the entire cabling project was awarded to ADC. Based on previous experience with ADC products, Rewers and his team deployed ADC connectivity solutions throughout the stadium to ensure a high-quality, reliable and cost-effective network.

Working closely with Scholes Electric of Piscataway, N.J., which Rewers characterizes as "one of the cream of the crop" of subcontractors, the BN Systems team began the cabling installation in December 2008. By early August 2010, they finished the job, having installed everything from the stadium's fiber backbone network to the drop cables that hook up all communications systems and devices. Rewers points out that the New Meadowlands Stadium is the first in the country to deploy an all-IP network.

The systems controlled by that network include data transmission; the voice-over-Internet (VoIP) telephone system; the 2,200-plus IPTVs, each connected via Cat 6A cabling; the security and CCTV surveillance system; the stadium lights; and the heating, ventilation, and air conditioning (HVAC) system. That IP-based network allows officials to control, using various computer locations throughout the facility, individual lights in the stadium, as well as the temperature in individual suites. In addition, the network controls all audio connections to stadium speakers; points-of-sale transactions at the ticketing offices and concession stands; and all parking-control facilities in the stadium parking lots.

The master telecom closet, which Rewers says basically functions as the stadium's data center, is located on the first level. "All the fiber and all the communications clouds, collapse back to that one site," he explains, "and that is the headend for the surveillance, the IPTV, the data network and the VoIP network."

Among the ADC cabling and connectivity solutions deployed by the BN Systems team in the New Meadowlands Stadium are the TrueNet® Augmented Category 6 cabling system for voice operations; RMG fiber enclosures and the TrueNet Fiber Panel series for the fiber drops off the backbone; and feed-through connectors for the high pair-count copper cabling.

"It was such a dynamic project with everything constantly changing," Rewers says. "Drawings came in and changed on a daily basis, and we had AutoCAD operators working full time, trying to get this information to our contractors in a timely fashion, getting the labeling updated, and getting the pull schedules coordinated and updated. It was dynamic, daily activity, which was very, very challenging," he says, adding that a project of this scope and complexity "is not for the faint of heart."

Now Comes the In-Building Wireless Solution

Multiple vendors competed for the New Meadowlands Stadium wireless system, and Verizon Wireless chose ADC's InterReach Fusion® and FlexWave Prism™ distributed antenna systems (DAS). The InterReach Fusion system provides multi-operator wireless services throughout the inside of the stadium. The distributed antenna systems support Verizon Wireless and AT&T Mobility through a unique approach that allows each of the operators to use its own equipment and to control its own operations instead of sharing capacity from and supporting a single system.

The FlexWave Prism DAS provides wireless service for parking lots and other areas adjacent to the stadium. It supports four different frequency blocks, covers a large area from each antenna and has sufficient power to provide high data throughput.

John Spindler, vice president of wireless product management for ADC, says ADC won the business primarily because its systems support, via multiple-input-multiple-out (MIMO) design, both LTE and Advanced Wireless Systems (AWS) technologies.

"Our unique ability to provide MIMO without doubling the amount of cabling involved was a big factor in the wireless carriers' decision," says Spindler, adding that the MIMO-based design is especially important because it enables the ADC InterReach Fusion system to maximize the data throughput of LTE systems.

"In a wide-open stadium such as New Meadowlands, providing wireless coverage is relatively easy," he says. "With two to five antennas and high power, you can provide the necessary coverage. However, the wireless user needs capacity. Any one sector of a cell site can transport just so much information, but our design can provide many sectors to different parts of the whole system and thereby provide lots of coverage and capacity."

Spindler says ADC has designed the InterReach Fusion wireless system to enable operators to deliver capacity easily on an as-needed basis, up to 24 sectors in a venue such as New Meadowlands Stadium. "A carrier may start with six sectors, and then either Verizon or AT&T can individually sub-divide the stadium into smaller and smaller slices without changing the cabling. It all gets done in the closets. In other words," he says, "either one or both operators can add coverage and capacity without doing a forklift upgrade."

ADC's DAS system ensures that any Verizon Wireless and AT&T Mobility subscriber within the New Meadowlands Stadium can place calls and use mobile-broadband services, even during capacity-crowd events.

Transparent to any and all smartphone applications that the operators may choose to offer initially or at some future date, the ADC systems are designed to allow the fans "to do whatever they could have done originally on their phones." Spindler emphasizes the systems do not add any new wireless capabilities but simply "ensure the fans' phones work the way they're designed and expected to work" by providing high-quality coverage and high data-throughput rates.

ADC installed four physical layers of equipment and cabling, with 230 remote and antenna locations per layer. Verizon Wireless and AT&T Mobility own two layers each--one that does cellular and PCS transmission and another that does LTE MIMO.

Two FlexWave Prism nodes are deployed on the outer edge of the New Meadowlands Stadium for parking-lot coverage for Verizon Wireless' customers cellular, PCS and LTE MIMO transmissions. The operator wanted a solution that could provide quality coverage and capacity everywhere possible, following the customer from the parking lot all the way inside.

Although ADC is not supplying the wireless LAN equipment, the ADC team is installing the cabling for that equipment, as well as for the wireless solution, because the DAS and LAN systems share conduit. ADC began the wireless installation in June and expects to complete it in October.

Home multimedia capabilities such as HDTV and streaming video today offer such rich TV broadcasts that many sports and entertainment fans, rather than going out to a stadium, prefer to enjoy games and concerts in the comfort of their own homes. Stadium owners and professional sports organizations intend to lure fans back into the arena by providing even bigger versions of those technologies. To deliver the outsized video and audio applications necessary to fill stadium seats and keep fans coming back for more, owners and teams know they have to deploy the most advanced networking technology available. That's why the New Meadowlands Stadium deployed ADC's integrated network-infrastructure solutions. Now they can offer everything it takes to bring even the most committed couch potatoes out to a real-live game.

CASE STUDY

Website: www.adc.com

From North America, Call Toll Free: 1-800-366-3891 • Outside of North America: +1-952-938-8080

Fax: +1-952-917-3237 • For a listing of ADC's global sales office locations, please refer to our website.

ADC Telecommunications, Inc., P.O. Box 1101, Minneapolis, Minnesota USA 55440-1101

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