



SPORTS & ENTERTAINMENT and CDW

**360° STADIUM
TECHNOLOGY SOLUTIONS
TO IMPROVE GAME DAY FOR
FANS AND STREAMLINE
I.T. OPERATIONS**



WINNING THE FIGHT FOR FANS

Fans have plenty of reasons to stay home to enjoy entertainment on TV, but powerful technologies can enrich the in-stadium experience and make a convincing case for coming to live events in person and creating unforgettable moments.

Cold weather. Heavy traffic. Nine-dollar beers.

The truth is, it's easy for even die-hard sports fans to find an excuse to skip a trip to the stadium. Increasingly, live sporting events aren't competing only with other forms of entertainment such as movies for money and attention, they're also competing with themselves, in the form of home viewing. Big-screen, high-definition TVs — formerly luxury items — are now affordable for most families, and TV broadcasts become more sophisticated every year. And at home, fans have access to comfortable seating, limitless snacks and clean, private bathrooms — not to mention, it's free.

For many teams, this gap between the home and stadium experience has resulted in stagnant or even declining attendance in recent years. But this doesn't mean these fans will never come back. People still love the communal experience of throwing on their favorite player's jersey and cheering on the home team at the stadium. They want to tailgate, they want to buy their kids bags of peanuts and — above all — they want to be able to say they were there for the game-winning touchdown, walk-off home run or buzzer-beating 3-pointer.

Still, in order to win back these fans, venues must provide them with something they can't get at home. Increasingly, stadium owners are turning to technology to enhance the game day experience, from beefing up Wi-Fi to offering exclusive camera angles and replays via custom mobile apps. Fans love the features, but at many stadiums, the tech upgrades are also driving new sources of revenue such as selling concessions, team apparel or seat upgrades through the team's mobile app.

Many stadiums and teams lack the in-house expertise necessary to implement upgrades that will result in a seamless fan experience. **CDW's custom stadium technology solutions and services** can help. The experts at CDW map out solutions for streaming stadium-exclusive content, safely storing data, driving sales and more — helping venues solve the challenge of competing with the home-theater viewing environment.

The Foundation for a Great Day at the Ballpark

A robust wireless network connects fans, teams and stadium personnel, enriching the time they spend at the game.

People today expect to be connected all the time, wherever they go. And yet, when fans pull out their mobile devices at a stadium to upload a photo of the field or comment on an amazing play, they often find that they can't do it.

"People fundamentally want to share," Ken Rehbehn, principal analyst at 451Research, told *BizTech* magazine. "When they spend money and follow their teams with passion and come to their events, they want their friends and family to know."

Providing wireless connectivity to tens of thousands of fans at a time is a daunting undertaking. In fact, the technology has only recently evolved to the point where providing this high-density Wi-Fi is even practical, and the architecture of ballparks and arenas can create problems with signals. Stadiums that make this investment, however, often see big returns in the form of satisfied fans, free advertising on social media and the ability to power their own revenue-driving apps.

Cisco Connected Stadium Wi-Fi is one solution that gives stadiums this edge, through the use of directional antennas that beam

signals to specific seating sections, or even rows. For example, a 40,000-seat baseball stadium utilized Cisco Systems hardware to create a connected stadium, adding more than 400 Wi-Fi access points to help solve the challenges presented by concrete, a two-tiered seating system and 200 million pounds of structural steel.

Teams want fans to have the same experience at the stadium as they could have at home. Fans are thrilled to find the comforts of home while experiencing the live action at an event — engaging in social media, surfing the Internet, or even looking up statistics and video.



25%

The percentage of stadiums with download/upload speeds of more than 5 megabits per second*



To learn how a football team deployed a powerful Wi-Fi network at Arrowhead Stadium, check out the CDW case study at CDW.com/KansasCityChiefs.





12,000

The square footage of LED displays that can be seen throughout the AT&T Center in San Antonio*

“You have the ability to open up wide amounts of inventory to market, to sell, to appeal, to entice. In the old stadium environment, with fixed signage, the sign was there for the season, and you never could change it. Here we can change and offer up new opportunities at a moment's notice.”

—Peter Brickman,
Former Chief Technology Officer,
MetLife Stadium

Showing the Way

Digital signage gets the message out to attendees flexibly and effectively.

It may not sound like the most advanced solution, but improving stadium signage by converting to digital displays can greatly enhance the fan experience and create new sources of revenue for stadium operators.

“In the places that have gone down this path, they've realized more and more use cases,” says Dan Fagan, manager of strategic markets for CDW. “The creativity really comes into play.”

Stadium signage represents incredibly valuable real estate for getting out messages to fans — including basic information about where fans can find restrooms and concessions areas, as well as paid marketing messages from advertisers. The magic of digital signage is that it allows stadium operators to leverage this real estate in multiple ways.

For example, Fagan says, concession signs might switch at the end of an event to direct fans to the nearest exit. This can help speed fans' commute home, and it can also shorten the turnaround time if a venue has two events booked back-to-back. Or, advertisements near the concession line might show a replay whenever a team scores, so fans don't feel like they're missing out on the action.

Some teams have used in-stadium digital signage to display social media involving the team, perhaps tracking tweets that include a team-oriented hashtag. And at the 2012 Olympics, organizers even outfitted recycling bins with digital displays to communicate news, emergency alerts and transportation updates.

Most important — digital signs can be rotated from event to event. If a venue is hosting a boat show, a basketball tournament and a rock concert all in a single week, for example, the stadium's signs can show information and ads that are most relevant to each audience. As a result, this valuable real estate is never wasted, which is viewed positively by promoters and event sponsors.

Direct to Fans

Stadium-only content helps teams build closer relationships with their fans.

After investing in high-density Wi-Fi and quality digital displays, stadium operators can take advantage of this new infrastructure to deliver exclusive, stadium-only content to their fans.

This content, which includes **replays, exclusive camera angles, interactive games, stats** and more, can be delivered in one of two ways: on stadium screens via solutions such as Cisco StadiumVision or through mobile apps that fans can download directly onto their smartphones or tablets.

"That kind of engagement creates a much more interactive experience," says Robert Cohen, director of strategy at creative design agency HUSH. "This experience isn't present on the couch."

Cisco StadiumVision centrally controls and delivers targeted HD video to screens throughout a stadium. At the Staples Center in Los Angeles, arena operators use the system to deliver custom content and advertisements to more than 375 screens located in luxury suites, near concession stands and elsewhere. The system gives guests the ability to customize the content in their suites,



400%

The increase in revenue from select pilot promotions offered during certain professional basketball games at Los Angeles' Staples Center through Cisco StadiumVision during the 2015 season*

and it drove a **9 percent increase in concession sales at hockey games shortly after implementation.**

Custom mobile apps take media delivery to another level, giving fans the chance to select their own content. One football team deployed a mobile app that adds value to the fan experience by replicating some of the functions of both traditional game programs and TV broadcasts, providing player and coach bios, team and game stats, rosters, injury reports and news feeds, as well as access to highlights from other games.

Another football team deployed a similar app, and fans can use it to see three exclusive replay angles within five seconds of the end of each play. This replay capability makes sure that fans don't miss a second of action, and that the stadium is the best place for them to see a game.

To learn more about how a football team makes the in-game experience more interactive with its mobile app, read the case study at BizTechmagazine.com/Colts.



SPORTS & ENTERTAINMENT and CDW



1

GAME CHANGER: STADIUMS AND TECHNOLOGY

Teams and stadiums face an increasingly difficult challenge to engage fans who are lured to stay home by the comforts of watching games and events from their own couches. They need a strategy to treat their fans like stars, delivering the content, services and entertainment that make every event a unique, worthwhile interactive experience. Indeed, a study conducted by **Cisco** found that **63 percent of fans attended a sports event to enjoy the atmosphere of the venue.**¹

To deliver that experience, stadiums rely on a variety of technologies: mobile applications, websites, communication technologies, mobile point-of-sale systems, digital signage and displays, wireless networking, beacon technology and business analytics — all supported on the back end by a powerful IT infrastructure. Each of these technologies and services can provide a significant benefit for the stadium experience. When deployed with the right game plan, they can change the game entirely.

2

CONNECTING WITH FANS AWAY FROM THE STADIUM

Teams and venues can maintain a close relationship with their fans through mobile apps, social media and web presence. These tools provide a connection with fans whether they're at home, on the road or at the stadium, driving ticket sales and seat upgrades as well as purchases of items such as season tickets and team apparel.

1,400

to 1,500: Typical number of calls received daily by a professional football team's call center in the week leading up to the season ticket renewal deadline²



\$802,791

Amount of revenue produced by a mobile app that allowed in-seat food and beverage delivery at Levi's Stadium in San Francisco during the 2014 season²

3

STADIUM WIRELESS: CRITICAL CONNECTIONS

A robust Wi-Fi network helps fans connect with the team, the stadium and each other. It also links stadium personnel and front-end technologies such as phone systems, video displays, point-of-sale systems and mobile concessions, and video surveillance cameras with back-end IT infrastructure. A robust network can even help a team's performance on the field by connecting players, coaches and staff with access to digital playbooks, game film and other resources.

6.2
terabytes

The amount of Wi-Fi traffic handled by the wireless network during a major sporting event at the University of Phoenix Stadium³



800

The number of Wi-Fi access points that provide fans with wireless connectivity at the University of Nebraska's Memorial Stadium⁴



74%

The percentage of fans who said having HD video displays would somewhat or significantly enhance the in-game experience⁵



2,100

The number of HD television monitors installed throughout the concourse at the MetLife Stadium in New Jersey⁶



300%

The expected increase in the number of retailers who will deploy mobile POS over the next two years⁷



4

PUTTING I.T. ON DISPLAY

Digital displays and signage have become an essential part of many stadiums, offering vital information to fans, as well as replays, promotions and updates. These range from a 6-story-high HD video display to a concession sign that can be easily updated every day.



6

A DEEPER UNDERSTANDING OF THE FAN RELATIONSHIP

Stadium officials can glean deep insights by analyzing information such as ticket and concessions sales along with social data. By monitoring buyer behavior, such as how and when customers make purchases, teams and venues can align advertising and promotions. The insights that a business intelligence solution provides can help stadiums better serve their customers before, during and after an event or game, as well as foster ongoing relationships.



7

SAFETY FIRST

Keeping fans (and their data) safe is an important part of a positive experience. In addition to robust IT security, teams and venues can implement physical security measures, such as networked video cameras, to boost safety.



8

PERFORMANCE BOOST

Many teams are also finding that various technologies can help them improve performance on the field. From digital playbooks stored on tablets and smartphones to wearable devices that measure athletic performance and sophisticated video replay systems, technology can help coaches and players gain an edge on the competition.

1,000,000

The number of data points compiled during a basketball game by SportVU cameras⁹

5

FAN-FRIENDLY CONCESSIONS

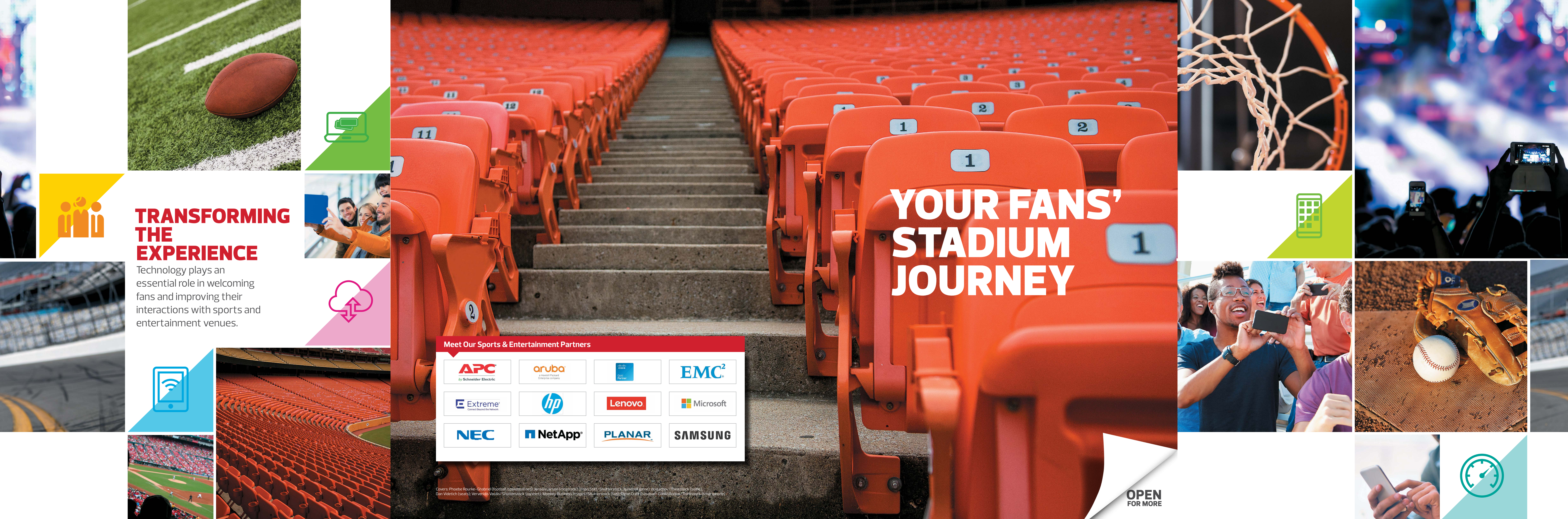
With a mobile point-of-sale solution in place, fans can stay in their seats to enjoy the event while they buy refreshments from roving vendors, all while paying with cash or credit.

SOURCES: ¹Cisco Internet Business Solutions Group, "Connected Sports Fan: Insights from the Cisco IBSG Horizons Study," September 2012; ²Mobile Sports Report, "Niners: Mobile app produced \$800K in food orders at Levi's Stadium," June 2015; ³BizTech, "Houston Texans Score Big with Major Tech Plays," August 2014; ⁴Mobile Sports Report, "Super Bowl XLIX sets new stadium Wi-Fi record with 6.2 Terabytes of data consumed," February 2015; ⁵Mobile Sports Report, "Stadium Tech Report: Nebraska adds Cisco-powered Wi-Fi, IPTV to Memorial Stadium," October 2014; ⁶Boston Retail Partners, "Mobile Technology - Transforming the Customer Experience," November 2014; ⁷Boston Retail Partners, "Mobile Technology - Transforming the Customer Experience," February 2015; ⁸NBC Bay Area, "State-of-the-Art Security Technology at Levi's Stadium in Time for Super Bowl 50," September 2015; ⁹BizTech, "March Madness 2015: College Basketball by the Numbers," March 2015; ¹⁰Cisco Internet Business Solutions Group, Connected Sports Fan: Insights from the Cisco IBSG Horizons Study," September 2012

Left to right: Matthew Roth/Adobe Stock (laptop, stadium); Tyler Olson/Shutterstock (smartphone); Roibu/Stock (camera)

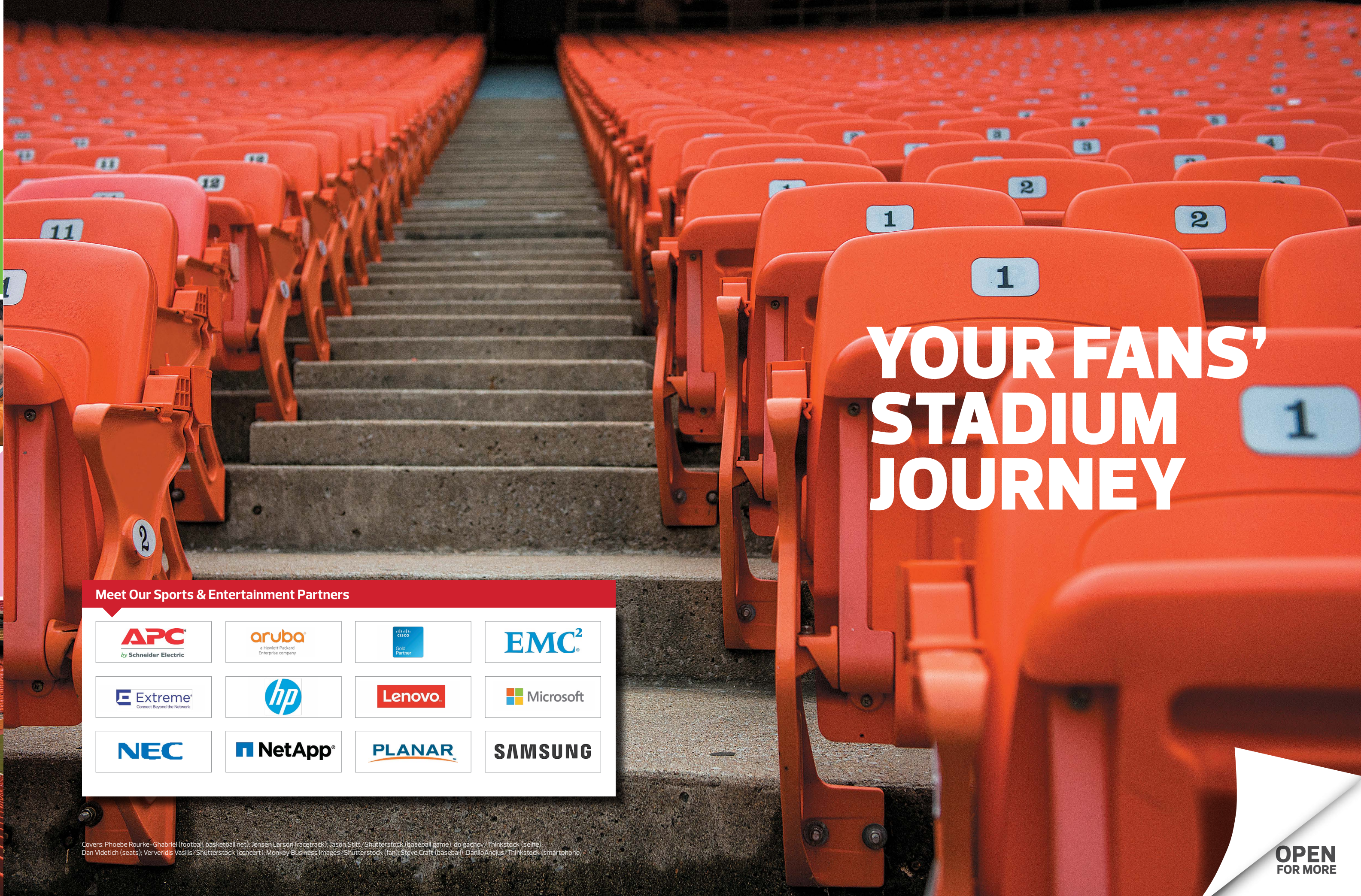
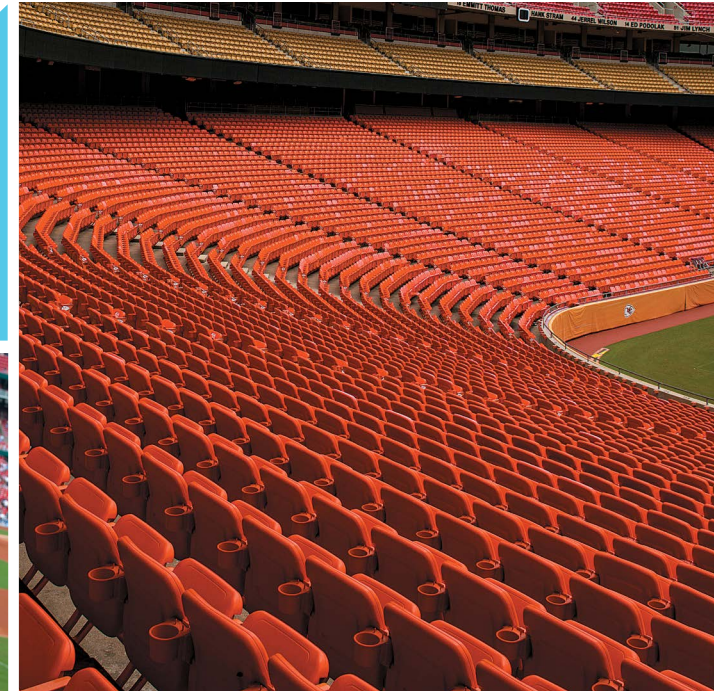
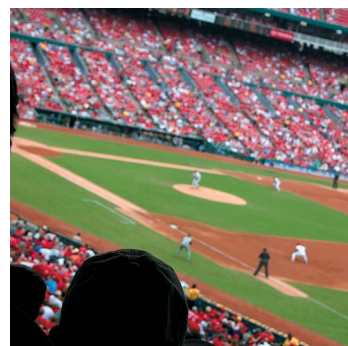
To learn more about making a gameplan for a better live venue experience, visit CDW.com/sports.





TRANSFORMING THE EXPERIENCE

Technology plays an essential role in welcoming fans and improving their interactions with sports and entertainment venues.



YOUR FANS' STADIUM JOURNEY



Meet Our Sports & Entertainment Partners

Covers: Phoebe Rourke-Gabriel (football, basketball net), Jensen Larson (ice track), Jason Stitt (Shutterstock, basketball game), Polachov / Thinkstock (celle), Dan Videtich (seats), Ververidis Vasilis / Shutterstock (concert), Monkey Business Images / Shutterstock (fan), Steve Craft (baseball), Danilo Arduini / Thinkstock (smartphone)

OPEN FOR MORE

Protect This House

Cybersecurity and physical security are essential elements for stadiums, arenas and large public venues.

With tens of thousands of fans accessing the network, the need for comprehensive cybersecurity measures is obvious.

"You're adding so many devices onto your network," says George Williams, senior manager, enterprise networking at CDW. "For all intents and purposes, they're rogue."

Providing fans with a pipeline to the Internet is simple, but teams and stadiums face a greater challenge when they need to provide separate — and secure — network segments for functions such as ticketing and concessions. And, of course, any time fans use devices or connections within the stadium to pay for things, the venue must ensure compliance with the Payment Card Industry Data Security Standard.

When one football team completed a massive Wi-Fi installation in 2014, the team beefed up security by implementing Cisco's Sourcefire, which offers next-generation firewall features. For example, the solution can show IT administrators the path that malware takes on a network to reach a device. This feature has greatly improved the team's ability to track down a specific device that has been infected and mitigate the threat.

Device security is another necessary component of an overall cybersecurity strategy. One professional team replaced its paper playbooks with iPad devices and made the secrecy of its plays even more secure in the process, giving the team the ability to remotely wipe the devices clean of data if they are lost or stolen. Finally, a team's IT infrastructure can also support physical security measures such as connected security cameras or bag-screening systems.



200

The number of connected security cameras that were installed in the University of Phoenix Stadium prior to a major sporting event in 2015*



To learn how one team's IT upgrade included a security boost, check out the CDW case study at CDW.com/ArizonaCardinals.

Networking Know-How

Fans love having access to Wi-Fi. They're thrilled to watch instant replays on their smart devices, and they value the ability to order concessions without leaving their seats. But most of them never see — or even think about — the infrastructure necessary to make this seamless connectivity possible.

Before stadium operators can roll out new features that drive revenue and fan engagement, they must first embark on a careful planning and design process. This means assessing the networking infrastructure already in place and developing a detailed plan for upgrades that can facilitate the desired level of functionality. Many organizations choose to work with a trusted partner such as CDW that can guide stadium operators through each step of the process.

George Williams, senior manager, enterprise networking at CDW, outlines the networking improvements that many stadium operators need to take their venue's technology to the next level.

Access Points

While many stadiums have at least some wireless antennas to facilitate team and office Wi-Fi, providing wireless connectivity to fans is a whole new ballgame. Williams says that many venues are deploying 500, 1,000 or even 1,500 access points to ensure fast and reliable connections. More and more, hardware running on the 802.11ac standard — the latest in wireless connectivity — is becoming the default option.

Edge Switching

"All of those access points have to come home somewhere," says Williams. That "somewhere" often comes in the form of state-of-the-art switches that can accommodate future growth. For example, when one football team deployed hundreds of new 802.11ac access points throughout its 63,400-seat stadium in 2014, it also upgraded to Cisco Catalyst family switches (3850 and 6880), which can scale to a 40/100 gigabit backbone.

To learn how an infrastructure upgrade helped a basketball team improve the power and reliability of its network, read the CDW case study "Nothing but Net" at CDW.com/Rockets.



“Managing the equipment has been like night and day. That's the greatest benefit from the upgrade. Now, we can get more reliable information from the equipment, so it's a lot less stressful to troubleshoot any potential issues.”

—Okpara Young,
Director of IT and Telecom,
Houston Rockets

**88.2%**

The percentage of stadiums with Wi-Fi coverage that provide connectivity for free*

Core Switching

The more teams and stadiums come to rely on their networks to facilitate revenue-driving operations such as mobile point of sale, the more important reliable core switching becomes. This may mean not only upgrading the core, but even duplicating those upgrades to prevent downtime. As part of upgrades to its stadium, a professional baseball team installed not one, but two Cisco Nexus 7000 switches. Although the team's IT staff had faith in the product's reliability, the team wasn't able to tolerate the risk of concessions that are supported by Wi-Fi coming offline, which would have cost the team up to \$1,000 per minute.

Cabling

While most stadium operators anticipate the cost of new antennas and switches, Williams says, many are taken aback at the amount of new cabling required to connect the equipment. "If you're looking at a professional or a major college venue, you can easily be at seven figures just getting cables pulled, and it can take several months," he says. Part of the reason for the time and expense is the concrete architecture of many stadiums, which necessitates careful planning and drilling to pull new cables. Because of the expense, Williams says, many stadium operators are choosing to phase in these upgrades over the course of several years.

Power

Because most access points run over Power over Ethernet, Williams says, many teams and venues must improve electrical systems as part of their networking upgrades. This often includes the installation of uninterruptible power supplies (UPSs), which becomes more important as things such as door locks and emergency communications are tied into Wi-Fi systems.

Internet Connection

"If the connection out to the Internet is bad, it doesn't matter how fast the devices can talk to the access points," Williams says. In order to accommodate the traffic created by a new high-density Wi-Fi network, he says, many teams and venues must work with their Internet service provider to increase the size of their pipe to the Internet.

Robust Backbone

As technology extends stadium capabilities on the front end, it demands more robust data center support on the back end.

The more data teams and venues produce — in the form of mobile apps, customer transaction records and countless hours of HD video — the more they have to store.

"Stadiums are producing terabytes of data per game," says Dan Fagan, manager of strategic markets for CDW. "Some teams are asking for a couple of petabytes of capacity. That's becoming the new normal."

As their IT demands grow to meet new challenges and offer new services to fans, venue operators might find that they need to upgrade their servers, storage or power and cooling systems. Some are incorporating cloud storage in new ways or even completely redesigning their data centers.

When a professional baseball team upgraded its data center as part of a major technology and building renovation project, it was important to the team to stay with Cisco hardware, largely because the team's small IT staff was already familiar with it. The team opted for Cisco Catalyst 4500-X and 2960-X series switches and Cisco 5515 Adaptive Security Appliances, and also installed IPsec virtual private network connectivity between office, training and ballpark locations.

One football team's IT staff found that they needed to upgrade the team's data center — including power and cooling equipment — as part of an effort to upgrade the team's network and Voice over IP system. The team needed to incorporate servers and a storage area network to its data center to meet league requirements, but it also needed to add more of its own servers to accommodate future growth.

These additions would have pushed the team's existing data center beyond its cooling capabilities at a time when the stadium was facing occasional brownouts, causing servers to shut down when UPS units failed. With CDW's help, the team redesigned its data center using a hot-aisle/cold-aisle layout to reduce cooling needs, and also purchased an APC Symmetra PX UPS and four new APC air-conditioning units.

In addition to making on-premises upgrades, some teams and stadium operators may opt to take advantage of cloud solutions for services such as ticket sales and back-office operations.



To find out more about how a baseball team deployed a state-of-the-art IT infrastructure, read the CDW case study at CDW.com/Cubs.



A Fan-Management Playbook

Data from fans can be a gold mine for teams and venues that can gain insights from it.

When fans connect to a team's network — or create a user profile or provide social media login credentials in order to use a team's mobile app — they're getting something valuable, but they're also giving the team something in return: their data.

Savvy franchises have begun to apply business intelligence and analytics solutions to the information gleaned from fan connectivity to better understand fan behavior, find efficiencies and drive revenue.

"At the end of the day, it all comes down to data," says Dan Fagan, manager of strategic markets for CDW. "If you own the data, you can run the analytics. You can begin to understand who is sitting in your seats, and you can start to market to them outside of the stadium."

For example, Fagan says, if a certain player is having a phenomenal game, a stadium's marketing department might see that fans are looking up his statistics and posting about him on social media. The department could then create an on-the-spot promotion for the player's merchandise, taking advantage of this sudden popularity. Or, a mobile app might be programmed to sense when fans enter the team shop and use the information about the time they spend there to market to them directly. If fans are trying on a team's replica jerseys, for example, the app might deliver them a coupon for \$10 off team apparel.

Analytics can also help teams implement dynamic pricing models. With a better understanding of market trends, teams can confidently charge a premium for certain games and push up the price of unsold seats in the days before a game if it appears, for instance, that two top-notch pitchers are set to square off that night. The same ideas can even be applied to hot dogs, helping stadiums to reduce spoilage by selling off excess inventory near the end of games before road trips.



43.8%

The percentage of stadiums that use social media primarily to increase fan loyalty**

2 to 3

The number of temporary data centers that, along with the two permanent data centers, are needed to support some major events*

*SOURCE: NetApp, "On the Field and in the Data Center at Super Bowl XLIX," January 2015

**SOURCE: Mobile Sports Report, "State of the Stadium Technology Survey 2014," September 2014

CDW Government LLC
230 N. Milwaukee Ave.
Vernon Hills, IL 60061



SPORTS & ENTERTAINMENT and CDW

**and NOW YOU'RE
REALLY
IN THE GAME**

**Visit CDW.com/sports or contact
your dedicated CDW account manager
to learn more at 800.800.4239**

The information is provided for informational purposes. It is believed to be accurate but could contain errors. CDW does not intend to make any warranties, express or implied, about the products, services, or information that is discussed. CDW®, CDW.G® and The Right Technology. Right Away® are registered trademarks of CDW LLC. PEOPLE WHO GET IT™ is a trademark of CDW LLC. All other trademarks and registered trademarks are the sole property of their respective owners.

Together we strive for perfection. ISO 9001:2000 certified

MKT14K654 – ©2016 CDW LLC





SPORTS & ENTERTAINMENT and CDW

**and NOW YOU'RE
REALLY
IN THE GAME**

Visit CDW.com/sports or contact
your dedicated CDW account manager
to learn more at 800.800.4239

The information is provided for informational purposes. It is believed to be accurate but could contain errors. CDW does not intend to make any warranties, express or implied, about the products, services, or information that is discussed. CDW®, CDW.G® and The Right Technology. Right Away® are registered trademarks of CDW LLC. PEOPLE WHO GET IT™ is a trademark of CDW LLC. All other trademarks and registered trademarks are the sole property of their respective owners.

Together we strive for perfection. ISO 9001:2000 certified

MKT14K654 – ©2016 CDW LLC

