# CDW HELPS THE ARIZONA CARDINALS WIN WITH WI-FI

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The Arizona Cardinals' Mark Feller says IT upgrades at University of Phoenix Stadium were centered on offering fans a better experience than watching the game at home.

The Arizona Cardinals' stadiumwide infrastructure upgrade to the 802.11ac standard and its unified communications project are a winning combination.

## At a Glance

**ORGANIZATION:** Arizona Cardinals

**LOCATION:** Tempe, Ariz.

**I.T. EMPLOYEES:** 6

**HISTORY:** Founded in 1898, the Cardinals are the oldest continuously run professional football team in the United States. The team was a charter member of the National Football League in 1920 and began playing all home games at University of Phoenix Stadium in 2006.

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# 800+

The number of Cisco 3700 series access points the Arizona Cardinals IT team installed at University of Phoenix Stadium as part of its tech upgrade in preparation for hosting Super Bowl XLIX

**SOURCE:** *Arizona Cardinals*

*Business Week* has called University of Phoenix Stadium one of the top 10 stadiums in the world.

In 2010, *Sports Illustrated* named it the best new venue of the 2000s.

Rather than rest on its laurels, however, the Arizona Cardinals organization has been hard at work.

When the stadium was built in 2006, "we put in the best technology available at the time for an NFL venue," says Mark Feller, vice president of technology for the team. But, "technology is constantly enhanced, so we've been improving the stadium infrastructure ever since we opened it."

The Cardinals upped the ante in 2014 with a massive upgrade to Cisco Connected Stadium, which includes new Wi-Fi, security and unified communications systems, along with additional fiber and hundreds of new access points (APs) throughout the 63,400-seat stadium. This required upgrading to Catalyst family switches (3850 and 6880) that can scale to a 40/100GB backbone.

Wi-Fi in major sports stadiums is still not the norm, but a growing number of teams are following the Cardinals playbook. Those leading the way in IT upgrades — the Atlanta Falcons, Washington Redskins and Kansas City Chiefs — are realizing great success.

"I think we'll see this spread across the remaining teams," predicts Ken Rehbehn, principal analyst at 451 Research "It's nearly a force of nature now."

But, for Feller and his colleagues, it wasn't only about keeping pace: "We're in the entertainment business, and part of entertaining folks is giving them the capability to use social media to track information and communicate with their friends and families while they're at our events. We want to make sure that our fans are coming to our stadium instead of staying home and watching the game on TV."

## Inside the Cardinals Wi–Fi Playbook

Saturday, Aug. 9, 2014, was the deadline for having the bulk of the new system in place. The day marked the team's first preseason game against the Houston Texans. Arizona fans would fill the stands regardless of whether the upgrade was complete.

"That was our target date, and it wasn't going to move," Feller says. Fortunately, his team spent so much time interviewing technology partners and discussing options that by the time they tapped CDW in April, much of the plan was already in place.

"We were able to hit the ground running," Feller says. "And it was kind of a sprint, because we had about three months to get everything going."

With a project of such scale in a venue the size of University of Phoenix Stadium, every step required careful planning. Just ordering the equipment, securing the proper licenses and maintenance agreements and having the technology delivered to the stadium and to the team's Tempe office was complex. "We didn't have a big warehouse storage area where we could have it all delivered," Feller says.

Further complicating matters was the fact that there were other construction projects and events going on while the system was being installed, and the team was training daily at the stadium throughout August. "We'd have to work around our football team to get some things done," Feller says.

Installing the stadium wireless equipment was especially challenging due to the facility's size — 1.7 million square feet.

"We were putting in 800 APs in locations scattered all around the building, and a lot of those locations didn't have any connectivity at all, wired or wireless, so we had to put in new cable," he says. "When you think about doing that for 800 devices, that's a lot of planning and labor."

Once they received and configured the equipment, they had to coordinate with the cabling company to ensure they had the fiber-optic cabling "to connect point A to point B," Feller explains. "We've got about 38 remote wiring closets that we had to have that fiber connected into."

While Feller's team and CDW carefully planned out the system, they left room for adjustments. The team

monitored Wi-Fi use during the first few events of the season to fine-tune the network. They also adjusted plans to accommodate newer technologies on the market. Feller's team was so impressed with Cisco's Sourcefire (which offers several next-generation firewall features, such as showing the path malware takes on a network to reach a device), that they decided it should be added to the upgrade, Feller says.

"We didn't have that capability before," Feller says. "We would know if we had a potential device in our network with a virus or malware, but we couldn't always track down the specific device. And that was a problem, because then we had to do a trial-and-error process. It was time consuming."

A new UC system is another important component in the upgrade. When complete, the organization plans to host a PC-based call center. When a call comes in, a screen will pop up that includes information about the caller (for instance whether he or she is a frequent customer or VIP), allowing representatives to offer more personalized service, CDW UC Engineer Steve Radogna explains.

The upgrade will also include Cisco's WebEx online conferencing and collaboration tool and IP-based phones.

"We've got the capabilities for people to do a lot of work wherever they happen to be using mobile devices with connectivity and access to our systems," Feller says.

The list of options to choose from is virtually endless on an upgrade the size of that undertaken by the Cardinals, but it's important for teams to deploy each piece carefully, CDW Senior Wireless Consultant Travis Bugh cautions. Bugh has served as the technical lead for several sports facility upgrades, and he says stadium solutions are "incredibly unforgiving."

"You don't get weeks and months," he says. "The game is only four hours long, roughly. If there's a problem, it's glaring and big and in your face. Doing your homework will pay dividends when you flip the switch and you fill your stadium with tens of thousands of people."

## Beyond Football

The Cardinals never had a problem convincing fans to make it to the stadium: "We've sold out every game that we've played here — and that is 93 and counting," Feller says.

But upgrades weren't just aimed at pleasing Cardinals fans. The venue has also hosted the latest Fiesta Bowl, Pro Bowl and Super Bowl XLIX, and it will host the College

# Each Stadium Is Unique

Stadium networking and communication packages are carefully designed to deliver the right capacity to the right places without stepping on the media transmissions of surrounding buildings, explains Ken Rehbehn, principal analyst at 451 Research.

Other tools, such as cloud-based Software as a Service offerings, provide teams with nearly infinite ways to collaborate and solve a variety of management problems or bottlenecks.

On the wireless side, "to slap up access points on a haphazard basis in a congested arena with very demanding traffic patterns is a recipe for disaster," Rehbehn says. "Teams that are seeking to upgrade their capabilities should approach it in a very systematic fashion. It should not be dealt with on a piecemeal basis."

But even solutions designed specifically for professional sports stadiums should be customized, explains Travis Bugh, a CDW senior wireless consultant who has served as the technical lead for several sports facility upgrades, including University of Phoenix Stadium, the Georgia Dome and the Kansas City Chiefs' Arrowhead Stadium, among others.

"There's not an all-in-one solution for any of this stuff," he says. "It's too vague. It's too complex. It's not as though you log in to Cisco or CDW and just hit a checkbox that says, 'stadium solution.'"

The Cardinals considered a variety of products from different vendors for a recent stadium IT upgrade before settling on the features and capacity of Cisco's Connected Stadium package.

Not only does a football stadium present unique challenges in terms of the scale and design of the building, but the team also requires a system that offers flexibility to serve the variety of events hosted there throughout the year, says Mark Feller, the team's vice president of technology.

The current system is the foundation that will allow the team to transform the entire stadium experience for fans, Bugh says. Eventually, the system will help direct fans to less congested parking lots and gates, get them through ticket lines faster, let them upgrade their seats and even inform them of wait times for bathrooms.

"Everything from the Wi-Fi to the network to the point-of-sale delivery, ticketing — all of that is making that fan experience more efficient and more enjoyable," Bugh says.

## Confirming AP Locations and SSIDs

With nearly 850 access points (APs) deployed at University of Phoenix Stadium, it was important to ensure that each AP was installed in the correct location and servicing the correct service set identifiers (SSIDs).

CDW used the Fluke AirCheck Wi-Fi Test Tool to confirm this information. The handheld AirCheck is a purpose-built Wi-Fi testing device that's fast, accurate and convenient. Its quick scan rate and feature-rich software make short work of validating an AP's host name and the SSIDs it's servicing.

The CDW team uses AirCheck's sorting features to sort the SSIDs that are seen, then narrows those results by signal strength or signal-to-noise ratio to confirm AP locations. Alternatively, CDW experts can sort the APs observed by signal strength, then drill down to see what SSIDs are serviced. In either case, the whole process takes only a couple of button presses to complete. As part of CDW's normal event day support, the Fluke AirCheck is used to sweep an entire stadium looking for rogue devices prior to a game. If detected, it is paired with an external antenna to quickly identify the exact location of any rogue devices.

Prior to the 2015 Pro Bowl, for instance, the CDW team found and worked to remove more than a half-dozen Wi-Fi networks with the AirCheck tool — in less than 30 minutes.

Football Championship in 2016. It has housed sold-out concerts by the likes of One Direction, Kenny Chesney and U2, as well as smaller trade expositions, car and RV sales shows and business conferences.

"The technology that we deployed had to be flexible to be able to handle the great demand and the smaller events as well," Feller says.

It was worth the investment, he adds, because it attracts a wide variety of events and enables the organization to better market to visitors, which amortizes the cost of the upgrades, resulting in a quicker return on investment.

"It's good business," Rehbehn says of deploying strong Wi-Fi networks in stadiums. "It creates opportunities for teams to strengthen the relationships they have with the fans."

The upgrades at University of Phoenix Stadium were also driven by external factors. For starters, security breaches are no longer the exception to the rule.

"Home Depot, Target — all of these huge corporations were breached and may have been compromised," Feller explains. "We wanted to make sure we did as much as possible to prevent anything like that."

Another driver has been the explosive growth of mobile devices.

When the stadium opened in 2006, there were some smart devices with Wi-Fi capability, "but the personal technology that we all carry around and almost take for granted now really wasn't available nine years ago," Feller says. "We didn't have to support thousands of people using Wi-Fi-connected devices when we built the stadium."

Wi-Fi standards in 2006 "pale in comparison" to those of today, he adds.

The Cardinals sought a scalable infrastructure capable of accommodating technology advancements. The organization has already added a video feature, allowing fans to watch live-camera video, replays and a variety of camera angles on their mobile devices.

"We've got a lot of creative people in the company, and when they come up with ideas, we can always say, 'We can do that,' instead of saying, 'No, we don't have the capabilities,'" Feller says. "That's a lot of fun, being able to say 'yes.'"

Steve Craft

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