



Edge computing in sports: use cases at the 2022 FIFA World Cup and beyond

From real time player tracking to wearable technology and enhanced fan experiences, edge computing is rapidly moving into the mainstream within the sporting world. In this article, we deep dive four examples of how a theoretical use case has been spun into a live deployment, both at the World Cup to across the sporting world.

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Edge computing use case in sport #1: Player tracking for automated refereeing

Semi-automated offsides, the latest improvement on the ever-controversial VAR within football are currently being trialled at the FIFA World Cup in Qatar, and although they have not been without some controversy, for once this innovation seems to have been widely well received by the notoriously hard-to-please footballing world.

This solution works by determining the relative position of players 50 times per second, using 12 cameras mounted on the roof of each of the 8 stadiums in Qatar to locate and track individual players' every movement. Specifically, up to 29 different body parts are tracked for each of the 22 players on the pitch, as well as the football itself, to determine the relative position of players and assist referees in calling football's infamous offside rule.

Transmitting twelve video feeds, distilling the video footage into nearly 400,000 data points per second, and generating the real time insights from these is exactly the kind of use case which edge computing is well positioned to help enable. Although it's unclear the exact edge architecture being trialled, it has been reported that Ooredoo has partnered with Dell and Ericsson to equip World Cup stadiums with 'edge computing capabilities', a partnership which would imply a likely on-premises edge deployment.¹ The reliability, low latency and reduced backhaul costs enabled by edge computing directly facilitate the real time insights required by referees to make informed decisions.

Edge computing use case in sport #2: AR / VR for fans

Another significant innovation seen at the World Cup in Qatar is the introduction of augmented reality within FIFA's FIFA+ app. This has seen significant traction on social media, with ESPN going as far as branding it "the future of watching football".² Users of the FIFA+ Stadium Experience functionality within the stadium are able to hold up their phone to the pitch and unlock an interactive layer on top of the action unfolding on the pitch. Visualisations available range from simple name tags on players to heatmaps and live player statistics.

There have been other examples of these types of fan applications – and many are enabled through a combination of 5G and edge computing. For example, Orange has implemented a similar use case within the Orange Velodrome in partnership with the computer vision company [StatsPerform](#) and the mixed reality company [Immersiv.io](#).³

¹ [Stadiums gain ground as test beds for new edge computing applications](#)

² [Fans at world cup can use AR app to scan pitch and players in real time](#)

³ [Orange unveils 5G in-stadia AR and AI innovations](#)

Figure 1: Real-time statistics provided for those in the Orange Velodrome stadium – the VIP lounge provide Nreal augmented reality glasses for further immersion



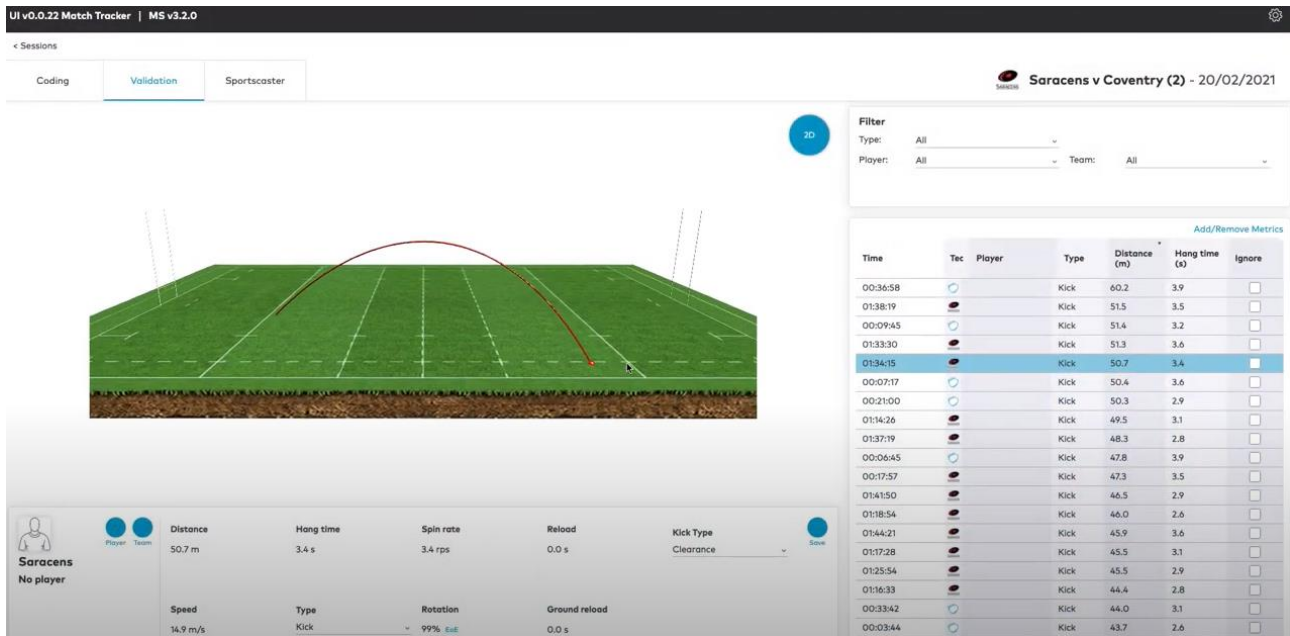
Source: [Immersiv.io](https://immersiv.io)

Edge computing use case in sport #3: Sport equipment tracking for analysis

This development in edge computing use cases within sports is not just limited to the Qatar World Cup. Take [Sportable](#), a sports analytics company, who have partnered with Gilbert, the rugby equipment manufacturer, to produce a smart rugby ball which can track various statistics such as kick distance and hang time. When facing the hurdle of rolling out this innovative technology to stadiums across the UK without compromising on speed or reliability, they turned to edge computing.

Specifically, via the network edge using AWS Wavelength embedded within Vodafone's networks (as demonstrated in the following video: [Distributed edge computing providing real time insights in rugby](#)). Not only does this solution ensure real time analytics can be provided to coaches, fans and broadcasters in real time, but it also ensures there is no complex set-up or maintenance of technology required from the consumer. In an industry where enterprises are unlikely to have large dedicated IT and networking departments, edge computing does a good job of marrying ease of use with real time insights.

Figure 2: Screenshot of the statistics platform provided by Sportable including the distance and hangtime of all kicks in the game



Source: Vodafone Business UK

Edge computing use case in sport #4: Edge IoT platforms in motorsports

Motorsports team strategists face many of the same issues as data analysts across the sporting world – how to generate the deep insights from data in the minimum time possible. However, as opposed to data being limited to two key components within many team sports (the player and the ball), in motorsports there are a plethora of moving parts to monitor and optimise to ensure teams give themselves the best chance of grabbing an elusive race win.

For example, McLaren Racing's formula 1 team have embedded upwards of 300 sensors in each of their cars, generating 1TB+ of data which teams need to analyse in real time to facilitate critical race strategy decisions. McLaren need to not just analyse the data feeds from these sensors, but orchestrate and manage the applications and devices, as well as distributing the insights to a variety of team members' devices. McLaren are notably working with VMware to enable these capabilities, leveraging their application management, multi-cloud and SD-WAN solutions. In comparison, their competitor Mercedes has partnered with Pure Storage to deploy data storage hardware to run their own advanced analytics solutions.

The global nature of the Formula 1 calendar lends itself to the flexibility edge computing solutions enable, with teams about the scale up and down the required infrastructure depending on the circumstances. Today, most of this infrastructure is dedicated to each team, but in the future network edge computing may mean that they no longer have to transport infrastructure with them around the world, but can rely upon the performance of the pre-existing edge infrastructure operated by the local telecoms operator(s).

A new dawn for edge computing in sports?

This is by no means an exhaustive list. There is evidence for a far wider range of use cases for edge computing within sports, such as video analytics for security, real time pedestrian flow analysis at major events and autonomous vehicles to transport athletes and fans at larger events (e.g. at the Olympics). Overall, the sports world appears to be embracing edge computing across a variety of use cases, and there is an expectation that this list will only broaden further.

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