



NTT DATA

Back 2 smart Stadium

**Getting fans back
with new technology
during COVID-19 crises**

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Introduction

The corona crisis has affected people, companies and countries worldwide. Life has changed dramatically and has not returned to “normal”.

Nevertheless, what was “normal”? It was normal to work in a clear working environment, to meet friends, to travel, to enjoy life without any restriction and to gather in big sporting events, concerts, trade fairs and festivals. However, due to the pandemic most of those activities have been cancelled or restricted and the “new normal” was born.

The impact of the corona crisis has reached all aspects of life and sport clubs are right now in front of a crucial decision. Are they going to let Covid-19 interfere with their businesses in a way that endangers their financial integrity or are they going to invest in the future? Invest in smart solutions, which are able to help them along the crisis and beyond. The future and investments often hold something fearful because of uncertainties however they are full of opportunities to change in the right direction.

This white paper will take a deep dive into several different areas concerning attendees in big events using the example of sports.

It will firstly express the status quo, the so called “new normal” and its implications for sport clubs around the globe. How the lack of fans beside the emotional impact has direct and indirect revenue implications. Afterwards, the complications for the sport clubs on different stages are explained, with a particular focus on the difficulties bringing fans back into stadiums despite existing health related restrictions. The next part outlines technology solutions that can be introduced to address these restrictions. Lastly an outlook on how those solutions can be developed even further in the future.

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“The New Normal” in Sports

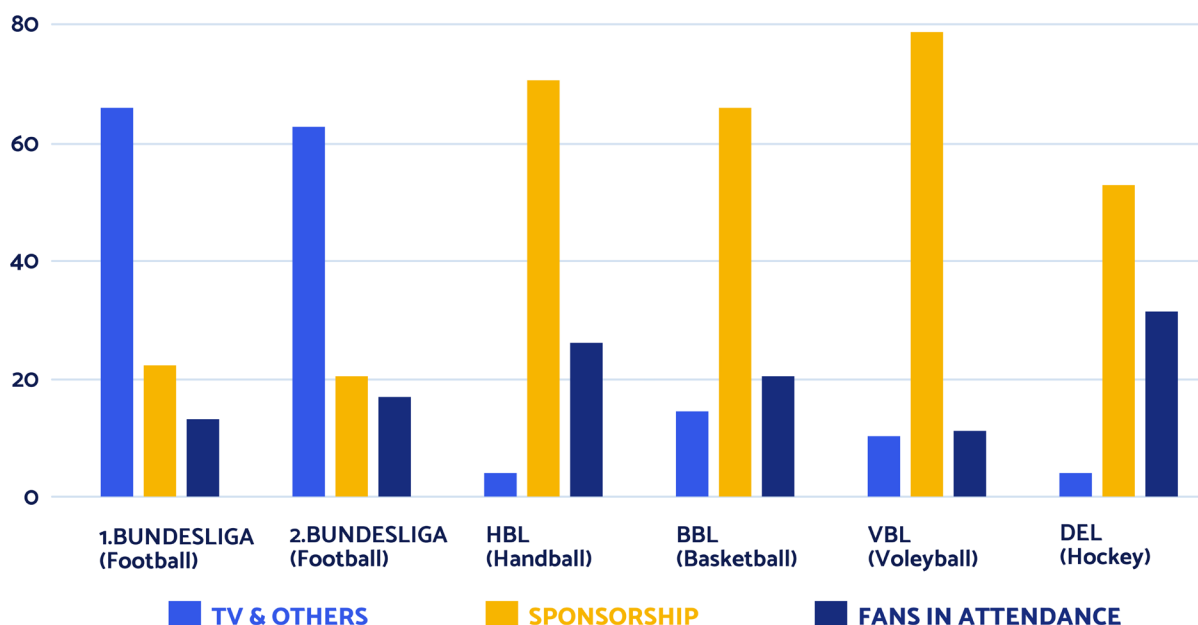
Corona has changed life and is considered one of the biggest challenges of society in this century - a pandemic, which is able to slow down the entire world as we knew it.

In March 2020 lots of sport leagues around the world started postponing or canceling their seasons after some of the matches with fans were identified as super spreading events and had a big impact on the expansion of the virus. The cancelation of games and leagues was necessary because of missing experience and the ambiguity of experts how dangerous the virus is.

After several months without any sport activities some leagues e.g. Bundesliga (Germany) and KBO (Korea) followed by others started to reopen their operations but all of them had to follow strict regulations, repeated testing and the absence of fans were necessities. Other leagues like the NBA created a bubble to guarantee a successful execution. In the autumn of 2020 some leagues allowed small amounts of fans back into their stadiums (e.g. Bundesliga) or allowed it depending on state regulations (NFL). These different approaches enabled the leagues to survive and saved many teams of financial bankruptcies, but they are not long-term solutions.

In different sports leagues, the financial impact related to fan attendances varies but in all of them it has implications. A study conducted in the German sports market observing six sport leagues emphasized the impact on revenue share.

REVENUE SHARE IN % FOR 2018-2019



As shown especially in leagues where TV deals on not so prevalent the importance of fans in stadiums is enormous. However, also the 1. Bundesliga (Football) has a big interest in bringing fans back in to stadiums. While it contributes only 13% to their revenue, it amounts in total for €520 million and is essential for the profitability of many teams. In addition to that, the lack of fans has a correlation to the viewership on television and streaming services. According to many top managers including Karl-Heinz Rummenigge and reported by media outlets, the tv ratings have dropped up to 30% for the first Bundesliga and are related to the decreased “fun factor” watching the games without fans in attendance. Similar rating decreases were observed in the NBA. These developments are likely to have implications on new tv deals (e.g. La Liga in Spain) and result in reduced sponsorship deals, which will increase the economic pressure on multiple teams and businesses. Other sport leagues such as the DHL (Hockey) were unable to restart their league for the 2019/20 season because without fans they were not financially viable and the season was cancelled.

The picture for 2021 is similarly unclear. Some of the European Football Championship matches took place with new fans, while other matches in other countries took place in front of full crowds. At the Olympic Games, which took place after the European Football Championship, spectators were not allowed.

These different regulations pose major challenges for event organizers, clubs and associations. At the time of August 2021, they can only plan from month to month. An unstable environment, as we have known since March 2020, will therefore remain for an indefinite period of time.

So, fans have a big role to keep leagues and teams financially stable and it is important to bring them back in attendance. Furthermore, the competition without fans is not the same because sport is driven by emotions and sharing them among each other. Nevertheless, this has not been achieved yet, with several questions and complications that have not been addressed properly.

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Complications

There are a multitude of complications and restrictions, which are hindering or limiting the appearance of fans in stadiums and arenas.

The current Covid-19 pandemic is characterized by the danger of infections and their uncontrolled spread. For this reason, the number of spectators admitted to sporting events is very limited. However, this leads to strong financial losses for the clubs, sports facility operators, ticket sellers, etc. The decision on the maximum number of fans allowed is based on a submitted sports facility concept and is made by responsible regional political authority. Most of the concepts that have been applied in recent months mainly consist of the implementation of distance control by mechanical and spatial separation and the implementation of hygiene measures. Recently, protection against the virus through vaccination can also be taken into account when developing a concept.

There are different objectives that right now have to be considered:

- **Proximity**

When (infected) people talk, respiratory droplets can jump from one person to another and are the predominant way to infect other people. Therefore, scientists recommend people keep a distance of at least 1.5 meters from each other. During a game, the cheering or yelling can propel infectious droplets beyond those 1.5 meters, which has led to high spatial separations among fans.

- **Shared environment**

One infectious person is likely to infect another in a stadium if the proximity is not given. However it will not result in a domino effect because the virus has to incubate in the second person first before that second person can then

transmit it to a third person, and the incubation usually occurs within three to seven days. Nevertheless, games last for hours and people move from one place to another, and that gives the virus through already infected people plenty of opportunities to succeed in spreading from one infected person to several healthy people in their vicinity in the stadium. An issue that makes it very challenging to protect spectators from Covid-19 and is known as fomite transmission. The shared areas in the stadium are stores, bathrooms, queuing or even moving through the stadium. This affects even more closed venues because of aerosols, which can last indoors up to seven hours in the air and infect people in a higher rate. This has led to indoor sport events not permitting fans at all.

- **The risk of the unknown**

What do we know about Covid-19? A lot but not everything. Science does not have all the answers yet to take action. Covid is has not been researched fully yet. This is illustrated by the example of the church hymns. First, they were allowed, then there was a big discussion and now it is mostly allowed in reduced form. The risk of such a situation is that rules and measures can change quickly. Today's concepts may already be outdated tomorrow.

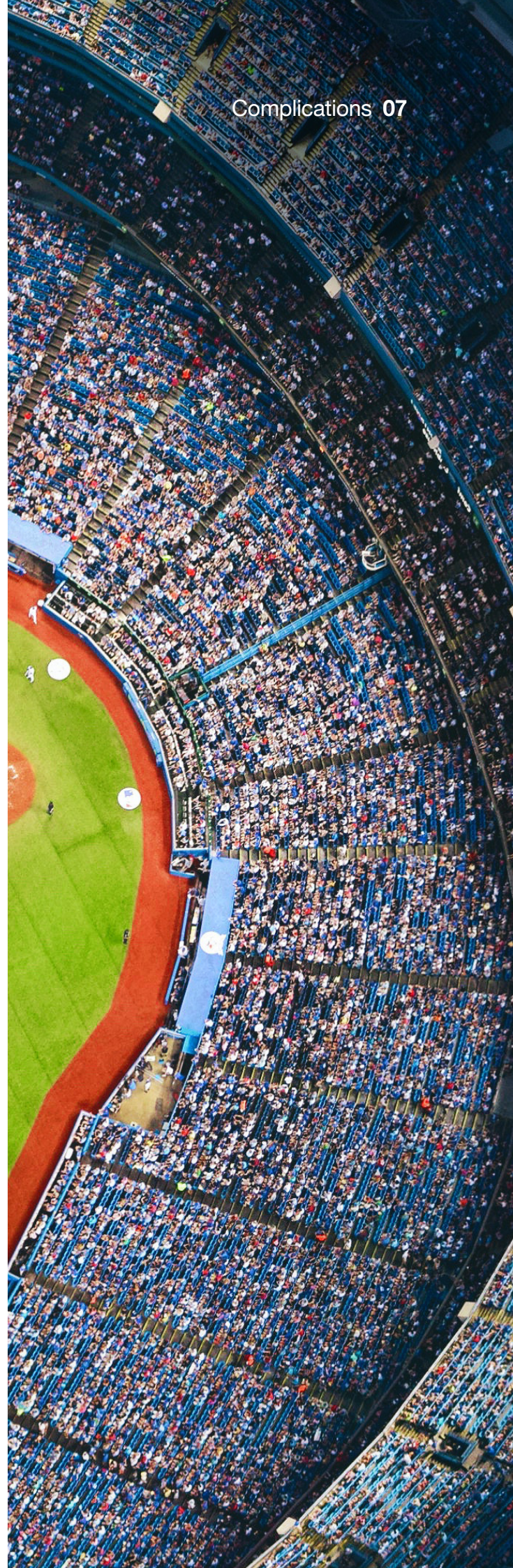
- **Vaccinated, recovered and tested**

Most European countries consider recovered, vaccinated and negatively tested people to be groups of people who cannot pass on the virus or have a very low probability of doing so. The recovered and vaccinated are also considered to be groups of people who have a very low probability of contracting covid. This gives new concepts a new and large scope to bring fans back to stadiums and arenas.

At the time of August 2021, Europe's major sports leagues are taking a variety of approaches to venue occupancy. From a very low occupancy rate of just 10% to a 50% occupancy rate and a maximum of 25,000 spectators. Here, in contrast to 2020, the progress is noticeable in the evidence of the test and above all through the vaccinations.

Therefore, concepts need to be created, which include smart solutions in order to bring fans back. In this case, dealing with threats and controlling the impact need to respect three essential activities: protect, detect, and respond. Technology can be a major success factor to bring back trust and confidence to the audience at big events.

**No concept
has been
developed yet,
which allows
stadiums to use
their entire
capacity.**



Solutions

NTT DATA has been working on an approach to bring back fans into the stadiums around the world.

There are several technologies, which are included in a single solution. With this solution, sport teams will be able to create new concepts that are going to convince (state) governments that sport events with fans can be carried out safely.

BioBarcode

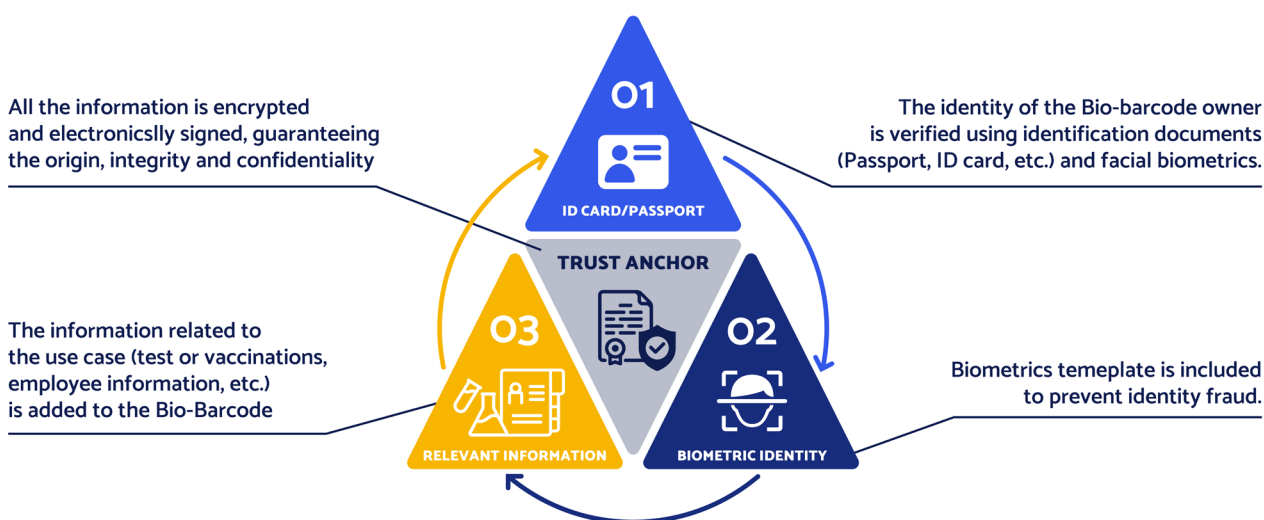
The BioBarcode is an extension of a personalized ticket around the biometric information of the viewer, as well as the integration of a required health status. This information is available in compliance with all safety and data protection requirements and is encrypted and visual coded. These codes are identified by a corresponding scanner hardware read and controlled at the inlet automates of the on-boarding process to the stadium. Only if ticket validity, a non fake ID, biometric comparison by face recognition and

a current negative corona test or vaccination- or recovered certificate are available, the fan is granted access to the arena.

With the bio-barcode solution, once the explicit consent is given and the biometric template is extracted, the information is stored in an encrypted high density barcode that is exclusively held by the data subject. Also the encryption key used in the creation of the bio-barcode is an effective safeguard to protect the biometric personal data from unauthorised access or tampering, allowing only those devices with the right decryption key to read the information stored.

According to article 25 GDPR as the data subject stays in physical control of his biometric data and there is no single point that can be targeted or exploited, the biometric personal data stored using the bio-barcode solution are protected "by design".

Our main objective is to guarantee the safety of the spectators who come to the field and for this it will be important to bet on 'contactless' and 'paperless' processes and on technologies that help implement the best health practices and regulatory requirements.



Indoor Navigation

This extension to the solution for fans is to help them find their "Points of Interest" in a simple and fast way. Every desired destination e.g. entrances, seating, food stands, toilets and exits can be included and supported. The fan will get a navigation to his Point of Interest without any detour.

Therefore, the technology supports the fans to find their destination quickly and will minimize their interactions with other fans.



To track contacts indoors, Back2BigEvents relies on our partner GiPS tech's high-precision indoor navigation using the earth's magnetic field (Hybrid Geomagnetic Localization). To do this, the technology provides an estimate of the user's position in a building based on real-time readings from smartphone sensors by fusing geomagnetic localization.

Contact-Tracing

Contact-Tracing is a mobile smartphone application that enables real-time monitoring of the proximity to other spectators. In addition to the radio signals such as Bluetooth other patented components of an inertial engine enable a precise distance measurement. For a defined period, the distances between the pseudonymized IDs of viewers in the system are saved. In case of infection a notification can be directed via push notification to all potential affected viewers.

Even though, the BioBarcode and the integration of Covid-19 test results and verifications of vaccination are included there are slim possibilities of infected people entering the stadium e.g. false-positive tests. In order to help to determine infection chains and to keep them as little as possible this solution will help to detect interactions and respond as quickly as possible.

This solution offers some advantages compared to the existing Covid-Tracing Apps used in countries in the European Union and meets all GDPR requirements better:

- Our solution is not based on the Bluetooth signal alone, but on Bluetooth and motion sensors. This allows us to better filter the Bluetooth signal, which is known to be unstable, and to consider "contact detection" only when the motion sensors indicate that two or more people are going to stay very close to each other for a certain period of time.

For more information about the disadvantages of pure Bluetooth solutions, we recommend the following [study](#).

- Our solution is also available to users who are not equipped with a smartphone by using a wristband.

Furthermore, the system determines the contacts in the background according to the distance rules of the regional authorities. In the event of an infection incident, the health authorities can use the data to trace infection chains in accordance with data protection regulations. This gives the public health department the opportunity to track the relevant contact chains at large-scale events in a manageable way, without having to contact all visitors after the event.

An example with numbers: If 49,000 spectators are admitted to a match and a single person subsequently turns out to be Covid19 positive during the visit, the health department will only receive a listing of their contacts (according to the distance rules - less than 1.5 meters and more than 15 minutes - rules almost everywhere in the world). This prevents all other 48,999 people from having to be contacted or quarantined by the health authorities.

Key Takeaway

1

The use of technology makes a full capacity utilisation of stadiums possible again despite Covid-19.

2

Get an overview of the content of medical scientific studies on the risk of infection with Covid-19 in stadiums during matches.

3

Understand how to prevent Covid-19 infection in stadiums by using technology, taking into account the scientific evidence explained above.

4

The use of technologies can better and more precisely comply with the legal requirements around the prevention of the spread of Covid-19 in stadiums so that the hygiene concepts of the clubs also work for games with 50.000 fans and more.

5

Understand what is the fan Journey thanks to technology and how security issues, data protection compliance and privacy are implemented in a way that is compliant with the GDPR rules.

Contact person

For more information about the technologies, delivery time and pricing model please contact one of our experts:

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NTT DATA – a part of NTT Group – is a trusted global innovator of IT and business services headquartered in Tokyo. We help clients transform through consulting, industry solutions, business process services, IT modernization and managed services. NTT DATA enables clients, as well as society, to move confidently into the digital future. We are committed to our clients' long-term success and combine global reach with local client attention to serve them in over 50 countries. Visit us at nttdata.com



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