



TATA
COMMUNICATIONS

Official Connectivity Provider



CASE STUDY

TATA COMMUNICATIONS AND FORMULA 1®. AN AMAZING JOURNEY OF TRANSFORMATION

**FORMULA 1®. IT'S THE WORLD'S FASTEST AND ONE
OF THE MOST CHALLENGING AND TECHNICALLY
ADVANCED SPORTS**



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FORMULA 1®. THE WORLD'S FASTEST MOTORSPORT IS ALSO THE MOST TECHNOLOGICALLY CHALLENGING

Formula 1®. It's the world's fastest, and one of the most challenging and technically advanced sports.

It's also a competition that changes by the split-second - quite appropriate really, as that's often the difference between winning and losing a race.

So, it's no wonder that six years ago, when the owners of Formula 1® began to recognise that they needed to push the boundaries in terms of sports entertainment, they turned to a technology partner who was just as agile, and just as committed to the transformation of their digital and media processes as them. A partner who not only had the largest fibre cable network but the technology wizardry and experience to bring everything together to create true disruption in the sport.

That's us, Tata Communications.

Our relationship with Formula 1® all started in 2012 in a deal that would change the sport forever.

Then Chief Technology Officer of Formula 1® unveiled a deal which would transform the way live races were broadcast and digital content would be consumed. For example, enabling remote production operations and substantially increasing the reach of the F1.com website through our content delivery network (CDN). All of this, thanks to connectivity from Tata Communications.

HOW WE DO IT

Tata Communications really does offer something unique. Namely that we can bring together media and digital like no other.

Our partnership with Formula 1®, which continues to grow from strength to strength, is about getting more quality content out, from more remote locations across the globe, and all in an efficient way.

We make it possible via the world's largest wholly-owned fibre cable network. 500,000km of subsea and 210,000km of terrestrial. Combined, these optic cables would reach 17 times around the world!

Today, our network carries more than 29% of the world's Internet routes - that's more than 12,000 petabits of traffic every month. And the data on it travels at approximately 195 million metres per second.

This incredible speed enables data to be delivered from any race location to the F1® Media & Technology Centre in Biggin Hill, UK. in less than a quarter of a second. (0.239 to be precise; there are those all-important fractions again.)

We can also share this data directly with the major F1® broadcasters, as we do with Sky, ORF, Overon and Ziggo.

But in truth, speed of service is only the half of it...

WHERE IT MATTERS MOST

Along with speed and coverage for broadcasting - not to mention making remote editing and production of content possible - our fibre network takes digital content and distributes it where it matters most. To the fans.

The fans are the lifeblood of the sport. They're vital. But, they're also an insatiable bunch, demanding more viewpoints, greater access, and all in ever-increasing quantities.

To be honest, we wouldn't have it any other way. It's a sign your sport is in good health when they demand more and more entertainment.

Today's Formula 1® consumers demand a deeply immersive, engaging experience through next-generation media platforms.

So, as well as being broadcast live, with video feeds to over 190 countries and territories and over half a billion-people watching every season, each race today is also massively consumed online.

Tata Communications hosts the official website, F1.com, which serves a whopping 44.2 million unique users and attracts up to 7 million users on a race weekend. Alongside this, the official F1® app has nearly 4 million unique users.

On these two platforms, videos on F1.com and the F1® app were played over 21 million times in total - and that was just the first half of the 2017 season.

The numbers speak for themselves. But they also support the move away from traditional broadcast media to the growth of the digital medium, with many fans now choosing to experience the sport in more modern forms.

HELPING TRANSFORM FORMULA 1®

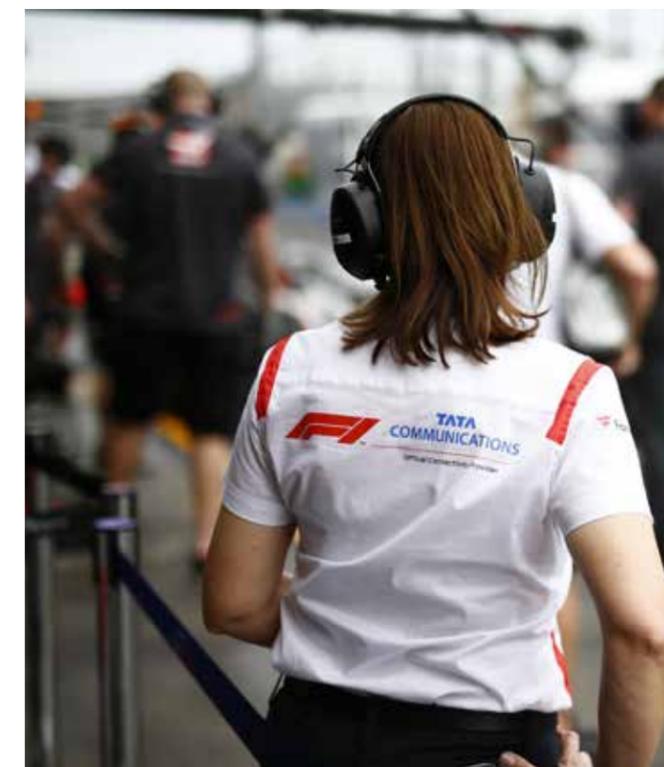
What this means for Formula 1® is that today, by working with us, they can get their sport to more people, in more countries, on more platforms. The barriers of exclusivity around the sport have been broken down to ensure fans are right in the mix, without losing the premium or glamorous image cultivated over previous decades.

And crucially, by adapting to the needs of Formula 1® and their fans, we're the ones who make it happen. With always-available connectivity. With the ability to instantly transfer high volumes of data across the world. With the scalability of web infrastructure to deal with high volume peaks in traffic. With the peace of mind that everything will be continuously monitored and secure.

What Formula 1® has today is the distribution means to reach and retain new-age audiences. And it does more than open new revenue streams. It also unlocks new opportunities.

Formula 1® has embraced digital as a medium of engagement, taking giant strides on social platforms to connect with its global fans. As an official technology partner, Tata Communications helps make this strategy possible.

As a result, a two-way channel has opened up, and it's allowed us to invite feedback and ideas from sources previously untapped.



CROWDSOURCING INNOVATION

We launched the F1® Innovation Prize in 2014, the sport's first global digital crowdsourcing challenge where fans could take a shot at solving real challenges faced by Formula 1®. Since then, the competition has run every year, with more than 200,000 fans both involved and engaged.

Tata Communications has also supported the drive for innovation with Formula 1®, through an annual Proof of Concept showcase. **Every year since 2013, during the Singapore GP, our proof of concept demonstrates a new technology that can help bring Formula 1® alive.**

Showcased through a live demo to a select group of partners, not only does this lay out the roadmap for Formula 1® to constantly adopt new broadcast and digital technologies, it also displays a readiness from the Tata Communications team to make the concept become a reality.

It's not just talk either. For the five proofs of concepts conducted since 2013, two have been deployed: remote operations in 2013, and live UHD 4K for Sky in 2016, who broadcast Formula 1® in UHD across Europe in 2017.

Now to be as responsive as this, we've really had to push ourselves. Refine our thinking. And transform. And in doing so, Formula 1® has discovered a partner who can adapt and keep pace with them. One who's agile, dynamic, dedicated and professional. And, of course, one who's always willing to do whatever it takes.

Tata Communications is perfect for a fast-driven sport, needing fast-moving technology, matched by the fans consuming faster and more hungrily than ever before.

But that doesn't mean everything's always gone smoothly. Just like with any Formula 1® race, there have been challenges to overcome.



Every year since 2013, during the Singapore GP, our proof of concept demonstrates a new technology that can help bring Formula 1® alive. And it's not just talk either. For the five proofs of concepts conducted, two have been deployed.

For more information, visit us at www.tatacommunications.com/sports/formula-1

GOING THE EXTRA MILE

As you'd imagine, for every race on the circuit, there's a lot of prep work that needs to be done before a single tyre can touch the track.

Tata Communications' dedicated team travels to each event around the world, providing a range of services that include planning, installing, testing and fool-proofing all manner of complex projects.

If that sounds heavy-going then that's because it is. Approximately 300 hours of effort go into ensuring a glitch-free setup two weeks before the Thursday of the race week.

But, to show just how far we go to get the job done, it's actually worth breaking down into more detail.

For every race to go ahead, certain things needed putting in place. Take the cables, for instance. These are something that have to be seen to be believed. Roll after roll, all needing to be unpacked and set up. 22km for fibre optics. 13km for the data. Oh, and 10 km of wires for the 147 microphones positioned around the circuit.

From here, a team of 200 people are housed in a tent, 50 x 15 meters, and guarded like Fort Knox. Usually prohibited to the press, this is not unlike a military operation.

The 200 know exactly what to do, and it largely involves being glued to the 415 TV screens and 288 computers installed in a labyrinth of partitioned rooms.

The Formula 1® personnel do an awe-inspiring job in setting this up whilst the Tata Communications team focus on monitoring the network to ensure there are no delays or disruption.

Welcome to the 4-gigabit nerve centre; putting our technology into play with Mercedes-AMG Petronas.

As the managed connectivity suppliers to the four-time FIA Formula 1 World Constructors' Champion™ Mercedes-AMG Petronas Motorsport team, **Tata Communications enables drivers like Lewis Hamilton to seamlessly speak to race engineers thousands of miles away from the track**, like they were actually there.

And, noticing a sensor flashing live in his cockpit, they can advise him; calibrating a pit stop in the right window to avoid an overcut from the rival team.

Unbeknownst to the millions watching from home, race strategy is decided on the basis of live data collected from the car. It can turn a place on the podium into a consummate victory. And all enabled by Tata Communications' lightning-fast managed connectivity.

With the drivers and remote technicians perfectly in sync, the data's journey is one of both epic proportions and speed.

Take the FORMULA 1® 2018 HEINEKEN CHINESE GRAND PRIX for example. First routing out of Shanghai and into our Hong Kong global node, then travelling sub-sea to Singapore, riding the Tata Communications' long-haul network via Mumbai, passing Malaysia, Thailand and Sri Lanka.

It then routes through the Middle East onto the Suez and into the Mediterranean, finally landing at Marseilles where we connect to land cable systems across mainland France. And finally crossing the English Channel to the UK and London.

34,000 km of fibre, all travelled in the fraction of a second.

Welcome to the live event.





WHAT THE FUTURE HOLDS

At Tata Communications, we know we work differently to most. Uniquely bringing together media and digital, for our partners in Formula 1® is no easy feat.

At a basic level, we sell connectivity, hosting and media products to Formula 1®. Beyond that we work closely with the sport's teams and broadcasters - both are our customers.

But beyond that still, **we have opened up a world of opportunity.**

With our fixed network in place, anything is possible. Location is no longer a restricting factor. **Remote production can take place with people thousands of miles away, working like they're actually there.**

The Tata Communications Pit Crew - our helpful team of smart, diligent experts - all channel a distinct 'whatever it takes' attitude to ensure that tasks that were once deemed too technical, or too logistical, now become benchmarks for the industry.

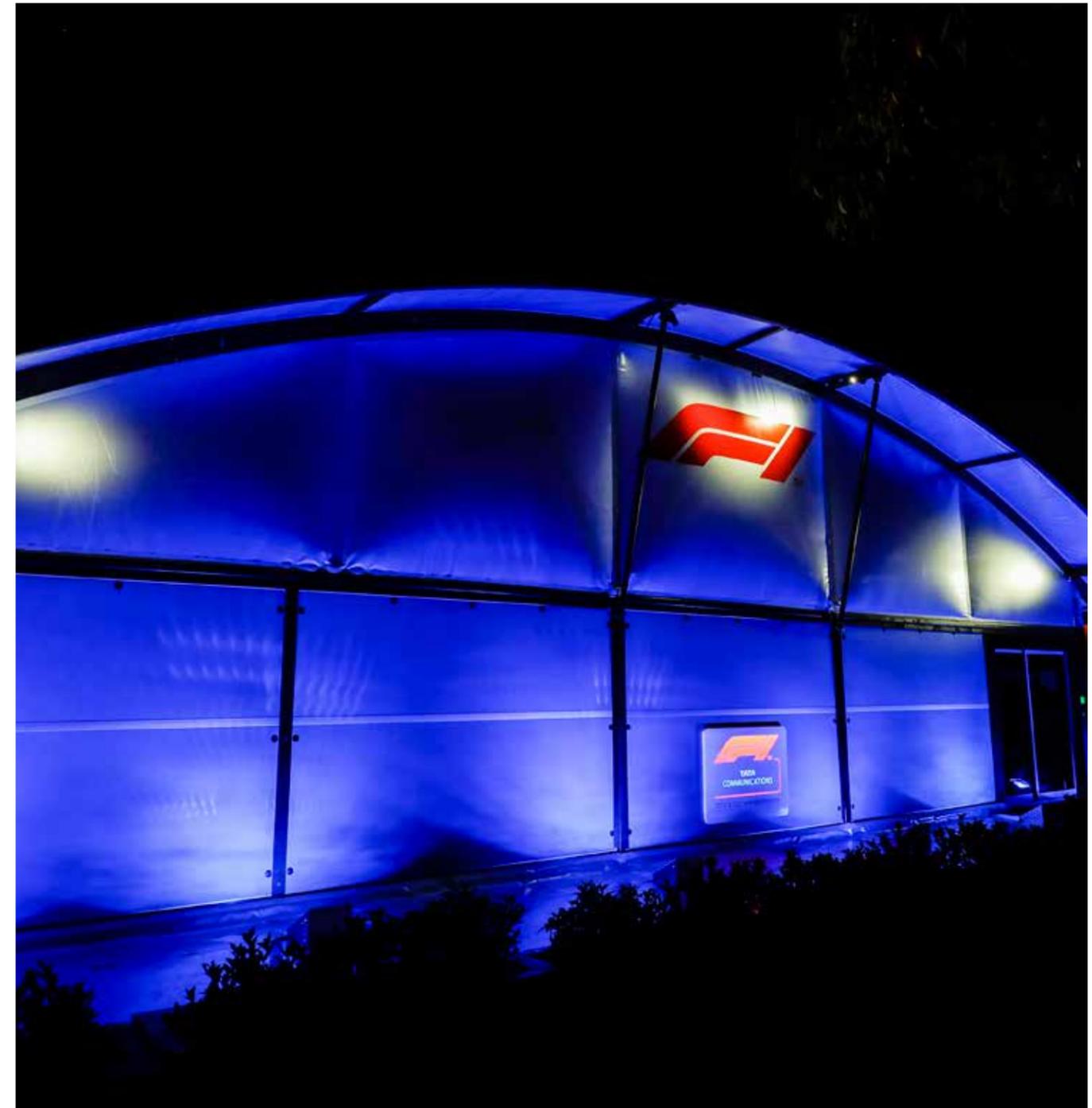
Formula 1® events have already been transformed. What the next step holds - for the sport, for Tata Communications, and for the fans - excites and intrigues in equal measure.

One thing for certain is that we know we're in the best position to help revolutionise again and again. Other sports no longer need to struggle in managing multiple suppliers for their organisational network, digital and media. We've proven what can be done with F1®. And in doing so, we've discovered much about ourselves.

That everyone wants a piece of the fastest. First on the grid. First on the podium. First to take the plaudits. But to be fast, you need to adapt. To your environment. To your team. To the world.

Tata Communications. We're trusted to win. Just ask F1®.

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About Formula 1®

Formula 1® racing began in 1950 and is the world's most prestigious motor racing competition, as well as the world's most popular annual sporting series: The 2018 FIA Formula One World Championship™ runs from March to November and spans 21 races in 21 countries across four continents. Formula One World Championship Limited is part of Formula 1, and holds the exclusive commercial rights to the FIA Formula One World Championship™.

Formula 1 is a subsidiary of Liberty Media Corporation (NASDAQ: LSXMA, LSXMB, LSXMK, BATRA, BATRK, FWONA, FWONK) attributed to the Formula One Group tracking stock.

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