

SUSTAINABILITY IN LIVE PRODUCTION: THE PREMIER LEAGUE SHOOTS FOR NET ZERO

By [Fergal Ringrose](#) | 25 May 2022

As part of [IBC's Accelerator Media Innovation Programme](#) in 2021, a team of sports broadcasters, rights-owners and technology vendors delivered an English Premier League production workflow trial to support the goal of a net zero carbon future for live productions. The IBC Sustainable Live Production Accelerator was an investigation into the way in which live content could be produced in the future.

The proof of concept (PoC) project team, made up of BBC Sport, BT Sport, Sky Sports and international rights-holders NBCUniversal and SuperSport, came together with the English Premier League, IMG/Premier League Productions and albert, the leading BAFTA-owned, industry-backed organisation supporting environmental sustainability in the screen industry.

albert aims to help the media production industry reduce carbon footprint and minimise its environmental impact, as well as providing audiences with an opportunity to engage with the climate agenda. Project technology, meanwhile, was provided by six media and technology ecosystem vendor participants: Amazon Web Services, Blackbird, Hitomi, Microsoft, M2A Media, Singular.live and Zixi.



Champions and participants

- [Read more Sustainability: how albert is expanding its reach](#)

The IBC Sustainable Live Production Accelerator asks the big question: how can broadcasters cut back, year-on-year, the resources they allocate to live broadcast sites? Various models of hybrid and remote production have been introduced in recent years, especially during the global Covid-19 pandemic with its various social distancing restrictions. Technology is moving rapidly onwards from traditional broadcast infrastructure with hardware vision mixers towards a software-defined

world and predominantly a cloud-defined world.

But... The availability of new technology poses even more questions:

- Do software-defined technologies running in the cloud actually reduce the carbon footprint on any given production?
- Is the current generation of cloud-based tools good enough for a Tier 1 sporting event like the Premier League?
- Do new tools and technologies provide production teams with enough scope to really tell stories in the way sports broadcasters have been doing so successfully for many years?
- Is the platform in the cloud fully secure for very high value sports rights, such as the Premier League?

For this Accelerator trial, the PoC group also wanted to investigate if there was a difference between the connectivity footprint of remote and cloud workflows. This is an area that had not previously been investigated and not previously captured in production footprints.

Proof of concept workflow

The PoC project team deployed bespoke workflows and architectures, alongside a traditional outside broadcast production, to compare and contrast carbon footprints during the Premier League game on 16 December 2021 between Liverpool and Newcastle United. Sky Sports took on responsibility for the host broadcast eight-camera match production and the syndication of that feed to partners and international rights-holders.

“One of the black holes for us is that we’re a cloud platform, entirely digital cloud-native, and so we make assumptions that therefore we are a more environmentally friendly platform than, say, going out buying graphics hardware and shipping it around the world. But we don’t know, because we don’t get any measurement from our cloud providers,” Mike Ward, Singular.live

BT Sport took responsibility for a four-camera presentation production, adding the domestic UK broadcast wrap at its studios in Stratford. BBC Sport, meanwhile, took the host feed to make a file-based highlights production for the equivalent of its Match of the Day show for viewers in the UK. Last, but by no means least, Premier League Productions provided the 1080p50 world feed production which was cloud-converted for international rights-holders.

For this trial, Sky Sports took eight main cameras from the host broadcast and used LiveU LU 800 multi-camera devices on the NEP Connect network enabling them to send those signals directly to receivers in the Amazon Web Services cloud environment, which were converted to NDI (Network Device Interface). Sky Sports used Viz Vector Plus as the vision mix, with a purpose-built GUI for the operators to do replays, graphics and to cut the cameras. Main replay was running on two Simply Live ViBox replay controllers and clip players.



Saudi Arabia: In the midst of a takeover attempt of Newcastle United
Source: Newcastle United Football Club YouTube

With the eight-camera coverage, Sky Sports implemented a world feed gallery production at its Osterley headquarters. This production used a remote gallery footprint which was compared to the cloud footprint.

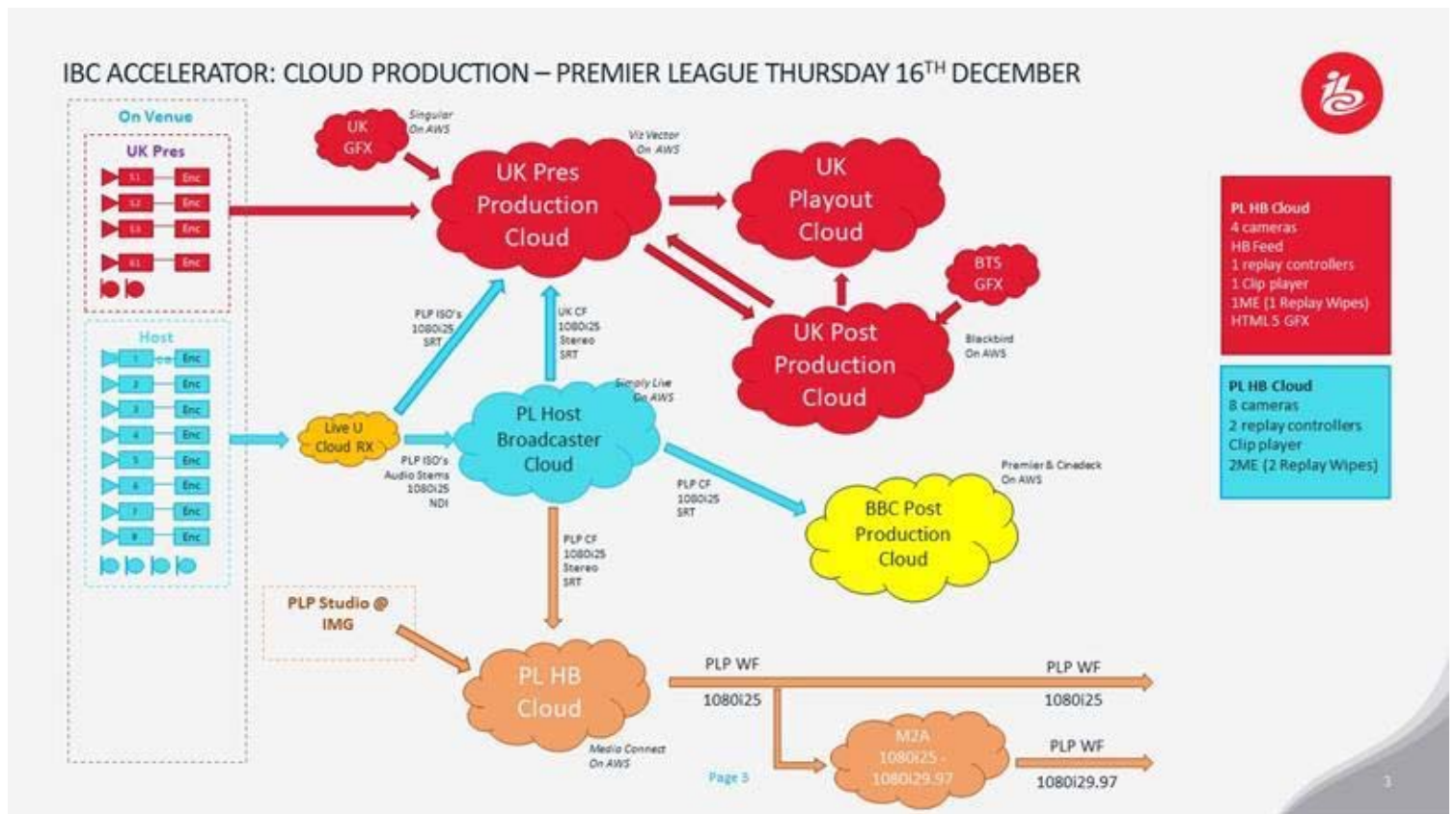
- **Read more** [BBC, BT Sport, Sky Sports, Premier League prove benefits of cloud for sustainable live productions](#)

BT Sport deployed a solution running on AWS and Microsoft platforms, with Viz Vector Plus for live production switching; VMix for replays and running in VTs; Singular.live for presentation graphics; Blackbird running cloud-native post-production, cutting a closer for the end of the

show. The world feed was syndicated with M2A Media, which provided a cloud transcode 1080i25 to 1080i50 59.94 conversion for North American rights holders. Zixi provided glue, some streaming replication in the cloud, and some of the security pieces, to send streams between broadcasters and the different partners.

BBC Sport commentary at the venue was combined with the vision feed and distributed as an SRT transport stream. System integrator 7fivefive set up the environment in AWS using BBC Sport accounts and provided a version of its management dashboard to control and monitor the cloud components. This has a web page interface with features such as system health reporting, usage statistics and the ability to start and stop cloud machines.

Ingest used the Cinedeck Capture2Cloud application which is available via the AWS marketplace. This took the selected SRT stream and recorded it as a 1080p 25 HD MXF file using the AVC Intra 100 codec. This was written as a 'growing file' to an AWS shared storage instance. A Leostream Broker presented a gateway as a URL for users to log into, and allocated available resources to them. At home, operators used iMac and MacBook Pro laptops running Teradici PCoIP client software to access the cloud machines.



High Level Cloud Workflow

In AWS, the software running on EC2 machines was RowZed for graphics creation and Adobe Premiere Pro CC2021 for editing. Teradici PCoIP was used to connect users to the AWS-hosted production technologies. RowZed is a BBC-developed application that creates BBC Sport branded on-screen graphics (team line ups, scores, substitutions, etc.) This is driven by data feeds for names and venues, and draws on a database of team logos and other elements. It renders graphics from an HTML base as .PNG or .MOV animations and saves them to shared storage for the editors to use.

In Adobe Premiere, editors were able to edit the match feed as it was being recorded and add graphics via drag and drop. The timeline of the match highlights edit was rendered as a file and delivered to the BBC Sport on-premise system using Signiant MediaShuttle.

Findings and new directions

Mike Ward is head of marketing at Accelerator participant Singular.live. “One of the black holes for us is that we’re a cloud platform, entirely digital cloud-native, and so we make assumptions that therefore we are a more environmentally friendly platform than, say, going out buying graphics hardware and shipping it around the world. But we don’t know, because we don’t get any measurement from our cloud providers. And Sky and BBC and BT Sport were saying the same thing - we just don’t get that data back from them.”

Most broadcasters have already found that remote production, compared to the traditional fully on-site OB operation, sees significant emission savings. This is not new information, and Sky Sports and other broadcasters have documented that remote production (compared to traditional workflows) can reduce the amount of crew travelling to site by up to 50%.

However, what this Accelerator project highlighted was the potential fuel reduction on-site that remote/cloud workflows allow. During the trial, the team found that the amount of fuel required on-site was reduced by over 50%. In addition the on-site infrastructure could be significantly reduced, which would allow for smaller trucks with less power draw in the future - further reducing the on-site facilities required. The carbon footprint difference between the OBs in this trial saw a 5% reduction in tonnes of CO₂e.

Findings from the trial included confirmation that cloud production reduces the amount of technical infrastructure required for the gallery production. For some broadcasters, this was by up to 70%. It also demonstrated that cloud production further reduces the requirements for

significant on-site technical facilities as it allows signals to be sent quickly and easily to multiple locations.

- **Read more** [Cutting the carbon cost of TV production](#)

This project focused on the emissions and power consumption for the cloud workflow, which in summary is a more sustainable workflow than remote and traditional productions. What it is important to add is the additional benefit cloud production provides.

From a crew perspective, cloud production encourages innovative new workflows, allowing for ease of access and less emphasis on the traditional hardware. This shift in technology encourages training opportunities and the switch to IP allows for a new IT-based skillset to join engineering teams, allowing the broadcast production industry to widen recruiting opportunities.

“Within 12 to 18 months we could go and do coverage of a 25-camera Premier League match in software. And from a viewer perspective it will look pretty much the same as what we do now,” Gordon Roxburgh, Sky Sports/Sky Production Services

The additional benefit of the cloud workflow is that it may in the future allow for shorter lead times as the kit can easily be restarted, permitting the utilisation of crew across multiple productions and enhancing the work-life balance.

The technical workflow shift from fixed hardware to more cloud-hosted software could lead to more affordable, easily updatable and more scalable production resources, enabling a team to easily add equipment when additional cameras are required. The industry should also reflect on the life cycle of technical equipment. The less we are investing in physical hardware and the more we can rely on cloud-based solutions, the less we are committing to landfill around the planet.

Increased ease of access

Another finding from this IBC Accelerator project is ease of access: the potential that this can provide in the future and the impact it has on on-site emissions. For a world feed taker, to be able to get access to the feed anywhere in the world via the cloud further reduces the necessity

to send crew on-site. The ease of access should encourage all broadcasters to question their on-site presence and associated carbon footprint.

The collaborators did find technology issues and challenges during the Proof of Concept trial. Gordon Roxburgh, Head of Production Technology, Sky Sports/Sky Production Services says: "It was the first time the team had pushed past two or three cameras. We did find issues there and had to drop it down in the second half of the match as we felt the bandwidth was really struggling. But that was the whole idea of what we were doing here: to really push to the limit at full all-up level.

"It's only when you really get into live content production that you start to see some issues. We found issues, which is great. It means we can now work with the vendors and the background techs to understand why it happened and how we push forward. How do we push it towards being a 25-camera broadcast, which is what a top-end Premier League match requires?"



The programme will provide industry benchmarks into live production for the first time

“Within 12 to 18 months we could go and do coverage of a 25-camera Premier League match in software. And from a viewer perspective it will look pretty much the same as what we do now,” says Roxburgh. “What we can’t do is make the programme that goes around that match. We can’t spend the hour before the match talking to people at different venues and all around the stadium, bringing this person in, throwing to co-commentators, rolling in the VT, doing the analysis. That’s the hard piece. It’s hard to do.

“We want to take that next step. But do we push it and make a poorer TV programme? No. The ten year journey we have already been on in remote production, to now being able to do pretty much anything we want to do, I think we’ll see that again – as long as it’s at the right pace. It’s achievable, as long as all the manufacturers come on board.

- **Watch the webinar replay** [The challenges of remote production](#)

“It’s worth mentioning that the technologists who work on this are different from the technologies who come from a video-based broadcast perspective,” says Roxburgh. “We’ve got a language we speak to do with how we produce live football, how we make our coverage. We’ve grown up with this and understand it – and we’re now bringing in people who really understand compute technology and product. We’re trying to educate them and why we need to do certain things, and that’s a challenge as we move into this way of working. We need to educate them in the vocabulary of live sport production.”

A fast turn-around environment

Charlie Cope, Technical Executive, BBC Sport says, “These things always throw up challenges, and for us the two main ones were around the edit-while-record workflows – fast-turnaround content whilst still in record is always challenging – and around audio handling. There are multiple audio channels we use to exchange content in the Premier League domain, where we’ve got multiple commentaries and different audio options flying around. That is always challenging to handle in the IP streaming domain - but certainly something we now have a good handle on from this PoC.

“It’s also worth mentioning that it can be the peripherals that catch you out, like comms and monitoring. These are things the production team expects to see as part of day-to-day workflows, and it’s easy to forget some of the nuances of these aspects they expect and need in a fast-turnaround environment,” says Cope.



“The final part is around how we capture the impact of our work and what we’re doing in that cloud-based

IBC Accelerator initiative will drive further research that supports carbon footprint reduction

environment, particularly the metrics around that so we can be really clear on the impact of these workflows in comparison to our traditional workflows. It’s fair to say those are still very challenging areas, in order to gain good insight into how moving into these workflows is going to impact our footprint in the future.

“The back-end power consumption in the gallery is also less. And for the first time we are also looking at our connectivity pathway and we’re working with albert to include that in the footprint and our understanding there. And, as a group, we are all working with the cloud providers to get that information, where previously we weren’t aware of what that solution actually looked like,” says Cope.

“One of the big benefits is around the elastic cloud solutions,” says BT Sport Chief Engineer Andy Beale. “Broadcast is a small industry, but we’re now sharing resource with all the global IT providers. Traditionally we might have turned our gallery front end off and the monitors in the room, but we have rooms full of broadcast infrastructure which run 24/7. We would never dream of spinning down or turning off our core infrastructure.

“With elastic compute we can turn it off, and that resource then becomes available for other people to use. We will find some interesting savings there, which we have yet to quantify but I think will actually be quite tangible.”

For Jo Finon, Manager of Responsible Productions, Sky Sports, “the best thing about this forum is that we work together to agree as a group. So, you haven’t got everyone going off down a separate path, to be reconciled at a later date. Now that we know the questions to ask, we are all going to be asking those questions.

“Similarly to how we have asked OB facility providers if they are on renewable energy and what are they doing to be more sustainable, now we will be applying that to the cloud providers as well and making sure that we can then choose appropriately.”

This IBC Accelerator initiative will drive further research that supports carbon footprint reduction for the sector, providing industry benchmarks and more measurable insights into live production for the first time.

For more on the IBC Accelerator Media Innovation projects completed in 2021 and those underway in 2022, discover the [IBC2022 Accelerator Programme](#)