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D4.1 Prototype Service Descriptions – initial versions

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Lead contractor for this deliverable**:** **BT**

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Confidentiality status: **Public**

Abstract

The four multi-screen service innovation prototypes that will be developed by 2-IMMERSE are described in this document. They are called “Watching Theatre at Home”; “Watching Theatre at School”, “MotoGP at Home” and “Watching Football in a Pub”. For each service innovation prototype the market context, the social context and the trial plans are described. Whilst the use cases are described very specifically, it seems clear that many aspects of service innovation concepts will have much broader applicability.

Target audience

This is a public deliverable and could be read by anyone with an interest in the way TV may use multiple screens to create better user experiences. It will specifically be read by the project consortium as it defines the user requirements that the technology being supplied by the consortium should satisfy.

Impressum

Full project title: 2-IMMERSE

Title of the workpackage: **WP4 Prototype Services Development and Trial**

Document title: **D4.1 prototype Service descriptions – initial version**

Editor: **Doug Williams, BT**

Workpackage Leader: **Doug Williams, BT**

Project Co-ordinator: Helene Walters, BBC

Technical Project Leader: Phil Stenton, BBC

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Executive Summary

Four multi-screen service prototypes, that will be developed and evaluated in the 2-IMMERSE project, are described. The four service prototypes are being developed using a design-led process that places considerable emphasis on both users and markets. Unlike existing services these prototypes are characterised by the fact that presentation of content is automatically coordinated across the available screens. This is facilitated by an object-based broadcasting approach for efficient content distribution.

The four multi-screen service prototypes address valuable and complementary content forms of live theatre and Sport. The first two, 'Theatre at Home' and 'Theatre in Schools', describe experiences based on filmed performances by the Royal Shakespeare Company produced by John Wyver who works for project partner Illuminations, that are designed for audiences at home and in schools. The 'MotoGP at home' service prototype creates personalised sports-related experiences using coverage of the MotoGP developed by Dorna Sports and distributed in the UK by BT. The final use case takes coverage of the Emirates FA Cup (the oldest and best known football knockout cup in the world) for which both BT and the BBC (both project partners in 2-IMMERSE) have distribution rights. It develops enhanced multi-screen use cases to enrich and deepen the enjoyment of football fans watching in pubs and clubs across the UK.

This document is the first iteration of a deliverable that will have two further updates.

The four service prototypes will be evaluated in turn during the 3-year project lifetime.

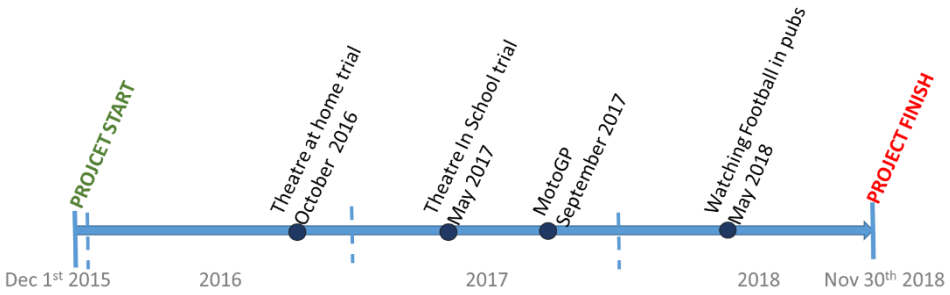

Figure 1. Schedule for the four service prototypes

The service prototypes that will be developed towards the back end of this project are less well developed than those that will be delivered sooner.

Each service prototype is described using a guide scenario that explains how a user interacts with the service. This guide scenario is used as the basis for generating the user requirements and hence for defining the capabilities that the technical platform must support. These technical requirements will be described elsewhere.

Alongside the guide scenario the market context and social context in which the services will be used are described. This provides relevant background for the development of the guide scenario and indication of the value of the market for which the service is being designed.

Current services that serve the same markets and which inform and inspire the innovation proposed by this project are also described.

Whilst the innovations are described with reference to precise markets and content types, the technical solutions to the challenges they create will be useful for a much wider range of content genres and markets than are represented in this project.

List of Authors

John Wyver

Andy Gower

Martin Trimby

Doug Williams (also compiler)

Reviewers

Pablo Cesar

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1 Introduction

The 2-IMMERSE project will develop four innovative service prototypes of multi-screen entertainment experiences. Unlike existing services the content layout and compositions will be orchestrated across the available screens and an object based broadcasting approach will be used for efficient content distribution.

This document provides the initial description of the multi-screen prototype services that the project 2-IMMERSE will demonstrate and evaluate. It should enable the reader to:

- picture the type of services we envisage
- understand why each extends the current state of the art
- understand our motivation for developing them
- understand the method we are using to conceive each service innovation prototype.

Four service innovation prototypes will be described. The first two, 'Theatre at Home' and 'Theatre in Schools' describe compelling experiences using the performances of the Royal Shakespeare Company for audiences at home and in schools. The 'MotoGP at home' service prototype creates personalised sports related experiences using coverage of the MotoGP developed by Dorna and distributed in the UK by BT. The final use case takes coverage of the Emirates FA Cup (the oldest and best known football knockout cup in the world), for which both BT and the BBC have distribution rights, and develops enhanced multi-screen use cases to enhance the enjoyment of football fans watching in pubs and clubs across the UK.

2 Approach

The service innovation prototypes are conceived using a user-centred, and market-aware process. This means each service innovation prototype must have a sensible fit with both the user behaviour and the market economics. It also means that each service innovation must be described in ways that ultimately lead to clear user requirements. This document encapsulates much of this design process.

The core of this deliverable is the four guide scenarios that we use to envisage the service innovation prototypes. These are high level user stories that describe how named users (persona) interact with our service innovation prototype. These high-level user stories encapsulate a number of key features, described in a solution agnostic way, that are innovative. The way these features are realised is worked out through workshops that focus on each smaller user story to create clear technical requirements.

These use cases are also derived with a clear understanding of the market. Markets are not homogenous and it is deliberate that the service innovation prototypes are developed with reference to particular well-defined markets. The solutions developed will probably be applicable in many adjacent markets but the focus is on developing compelling service innovation prototypes for well understood markets in which the service providers associated with this project have clear interests. The service providers directly associated with the project include BBC and BT.

The BBC do not seek profit; they seek value according to their purpose. They have six public purposes that include: '*Promote education and learning'; 'Stimulate creativity and cultural excellence'* and *Represent the UK, its nations, regions and communities'*. These public purposes could be supported through the development of experiences that bring the best British theatre into people's homes and schools, and that enhance the experience of key national sporting occasions such as the FA cup.

BT is a public limited company with a vision to "Use the power of communications for a better world." BT is a challenger in the UK Pay TV market and can benefit from well-differentiated appealing services that utilise the unique characteristics of its IPTV-based content distribution network. BT is more classically profit driven; BT invests billions in network infrastructure and in content rights and seeks to see return from this investment – a return it can only expect to realise through the creation of relevant compelling reliable and valued experiences.

Each service prototype is described using a guide scenario that explains how a user interacts with the service. This guide scenario is used as the basis for generating the user requirements and hence for defining the capabilities that the technical platform must support. These technical requirements will be described elsewhere.

Alongside the guide scenario, the market context and social context in which the services will be used are described. This provides relevant background for the development of the guide scenario and indication of the value of the market for which the service is being designed.

Current services that serve the same markets and which inform and inspire the innovation proposed by this project are also described.

Whilst the innovations are described with reference to precise markets and content types, the technical solutions to the challenges they create will be useful for a much wider range of content genres and markets than are represented in this project.

Watching Theatre At Home

This service innovation prototype is called **Theatre at Home** because it offers an enhanced social experience for users in a domestic context to watch a live or "as live" broadcast of a theatre performance. The user will have a second screen device that can access synchronized information streams directly from the provider of the broadcast and from the web through social media applications including Twitter but which can also, at times, feature audio and video chat with others who are watching.

The service innovation prototype will enable a user to watch a theatre production, shot with multiple cameras, as either a live or an 'as live' experience. Viewers will be able to contribute to and monitor different forms of feedback throughout the performance, and to discuss it with others who are watching at the same time, either in a different room or in a different home.

Owner: John Wyver (Illuminations) **Rights Originator**: Royal Shakespeare Company

Watching Theatre At School

This service innovation is called Theatre in School. This service enables pupils in schools across the country to watch a filmed performance of a play performed by the Royal Shakespeare company. Pupils are able to augment the main filmed presentation of a play with access to related supporting content and experiences to help them deepen their understanding of the play. This related content may include a synchronised transcript of the play, character summaries, short films featuring the talent in the play and even live communication session with the actors and other creative talent associated with the production.

Owner: John Wyver (Illuminations) **Rights Originator**: Royal Shakespeare Company

Watching MotoGP at Home

This service innovation will provide a user with a personalised experiences that can be controlled to suit a viewer's interests/experience with the sport. It will allow video footage and telemetry data to be displayed on a mixture of a large TV and on smaller personal screens. The trials with consumers will take place in multiple sites. Research insights will be captured from device/service instrumentation and follow-up qualitative questionnaires and interviews with trialists. We also plan to carry out VIP demos that could be held both at the track and at other VIP locations (BT Centre, BBC, Cisco, etc.).

The trial will focus on the Great Britain MotoGP race (September in 2017).

Owner: Andy Gower (BT) **Rights Originator**: Dorna Motor Sports

Watching Football In A Pub

This service innovation relates to an experience designed to suit UK city centre pubs showing sport. It will mix large screen viewing with opportunities to access content and interactive experiences that may be playful and promotional on personal screens. We anticipate a system capable of supporting a diverse range of experiences centred, ultimately, on a single sport event but that finds a way to encourage and promote business within the pub through promotions and possibly competitions.

The trial will be centred on the Emirates FA Cup Final that will be held in May 2018.

Owner: Martin Trimby (BT) **Rights Originator**: The Football Association

Figure 2 Descriptions of the 4 service pilots showing project owners and rights originators

This is an initial version of the document and not all prototypes will be fully described initially. Ultimately the document will explain:

- why these service prototypes have been chosen
- the context of their use, including a market perspective
- the value they try to create for the users
- the form of the prototype
- the form the evaluation will take and

The key trial dates for each of the service innovations are summarised as follows:

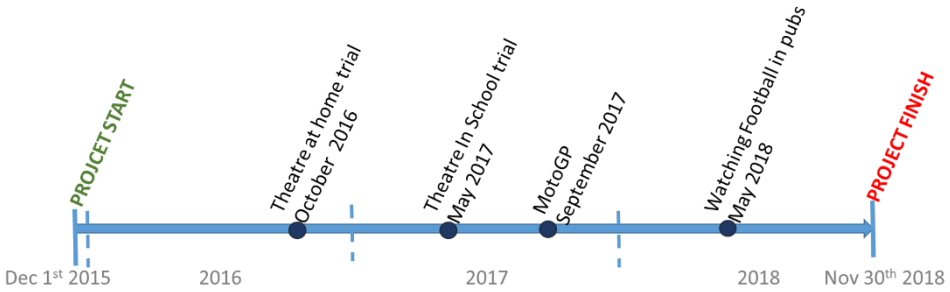


Figure 3. Schedule for the four service prototypes.

The four use cases offer varied characteristics in order to test the extent to which it will be possible to specify a generic technical platform to support a range of different experiences.

The following chart shows the diverse attributes addressed by the selected service innovation prototypes. It also includes an indications of the extent to which other variants, not addressed by the specific use case, may be addressable by the same system. For example whilst the theatre at home use case focuses on theatre it would work well for opera, ballet and orchestral performances as well. Likewise the MotoGP at home use case may also offer capabilities that could be used in other athletic track based events (as well as of course, other track-based motor sports). Likewise the solution for the football scenario may also offer useful component solutions for other types of sports such as striking and fielding games (cricket predominantly in the UK) as well as other invasion games such as American football, rugby, hockey, ice hockey etc.

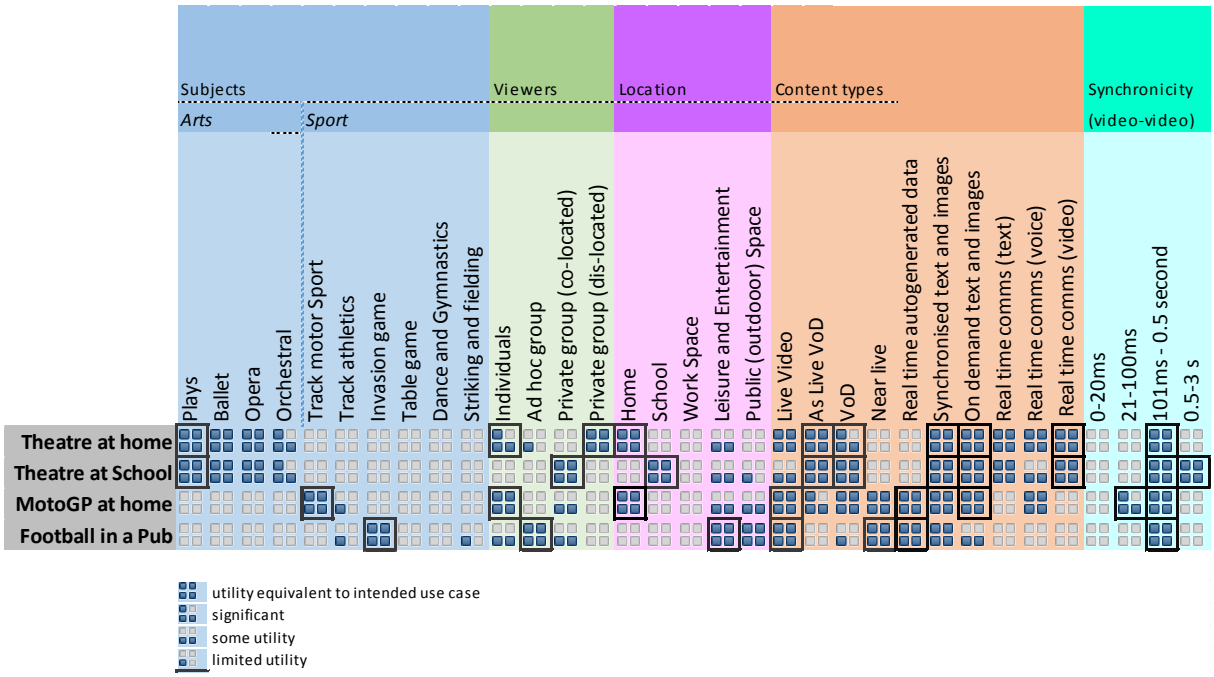


Figure 4. Chart showing the diverse attributes addressed by the selected service pilots.

3 Prototype Service 1 – Watching Theatre at home

Watching Theatre At Home

This service innovation prototype is called **Theatre at Home** because it offers an enhanced social experience for users in a domestic context to watch a live or "as live" broadcast of a theatre performance. The user will have a second screen device that can access synchronized information streams directly from the provider of the broadcast and from the web through social media applications including Twitter but which can also, at times, feature audio and video chat with others who are watching.

The service innovation prototype will enable a user to watch a theatre production, shot with multiple cameras, as either a live or an 'as live' experience. Viewers will be able to contribute to and monitor different forms of feedback throughout the performance, and to discuss it with others who are watching at the same time, either in a different room or in a different home.

Owner: John Wyver (Illuminations) **Rights Originator**: Royal Shakespeare Company

Figure 5. Overview of the Theatre at Home service pilot.

This guide scenario, which is written to help the reader picture this service innovation prototype features **Bob**, a 35 year old IT worker, who is friends with the married couple **Dave** and **Sue**. Sue is the organiser of the group. Sue is a teacher who enjoys performing in local am-dram productions and going to the theatre. **Dave**, a pest controller, is also keen on performing and watching drama. **Helen** is a friend of Dave and Sue, she is also a teacher. **Mike** and **Jane** are school friends of Sue, and they live across town with their young family.

3.1 Watching Theatre at Home– Guide Scenario

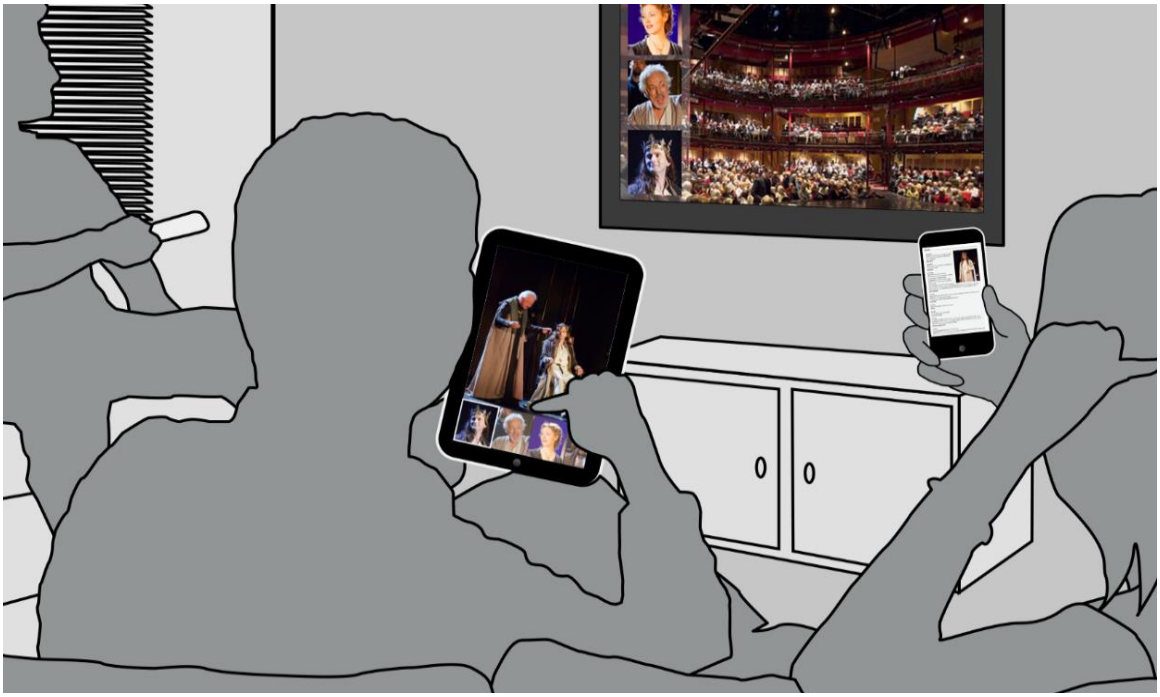


Figure 6. An example of a living room set up for a Theatre at Home scenario

Bob tries to see local plays if they look interesting or get a good review in the media or from friends. He has been along to the cinema to see some of National Theatre Live productions. Tonight he's watching theatre at Number 7, the home of his old school friends Dave and Susan and with one or two other graduates of Bridge St School who will share the experience remotely from their homes in different parts of the UK

Bob received the synopsis of the play a few days before tonight's performance, and he vaguely recalls a discussion it on *Front Row* in the week. That interview was posted as a link in the synopsis, but he decided not to listen to it again.

The performance starts at 8pm so Bob arrives at Dave and Sue's house at 7:30pm. Sue and Dave have a large TV in the corner of their living room and a second screen on the wall to the right. They both have an Android tablet and Bob has taken along his iPad. Sue switches on the Augmented Media Player (AMP) under the TV and selects the theatre setting from the menu that appears on her tablet.

The TV shows a wide shot of the Apollo Theatre's empty stage. On the second screen Bob, Sue and Dave can view (and perhaps navigate around) a 360-degree video feed from the foyer of people arriving and entering the theatre.

Sue shares that she is about to watch the performance on Facebook and pretty soon Diane's name pops up in response. Dave and Sue have set up a 'Theatre Box' so that more of their old school friends can share their thoughts and enjoyment on the play as it unfolds. Through this tele-presence media app groups of people can message to the whole group or 'whisper' privately to individuals annotating (e.g. 'like') bits of the broadcast in their messages. Sue selects the video-conference mode on the 'Box' settings and an image of Diane appears on her tablet. Bob signs into Sue's Box on his iPad and says hi to Diane.

Sue had talked to Helen about watching tonight's performance when they last met. She couldn't make it to their house but she invited her to her virtual Box. Helen appears on the Box app and joins Sue, Dave, Diane and Bob. They idly chat and catch up as the theatre continues to fill. Sue is interested to access more information about the play and the production, and she reads this on her tablet while the others are chatting.

Soon the noise in the theatre falls away as the Apollo's house lights go down. Dave dim's the house lights at number 7. The performance is about to begin. The tablet chatter of the virtual Box slows too. Just as the stage lights go up two more school friends Mike and Jane sign into the box from their home, apologizing for their last minute appearance.

As the performance proceeds Dave decides he can't understand the strange accents being affected by some of the actors and calls up the scrolling script onto his iPad to help him follow the dialogue until he can get used to the way they are speaking.

Sue is really interested in the staging of tonight's performance, and on her tablet she keeps open a fixed wide-shot of the stage, so that from time to time she can compare this with the screen director's live mix of the production which includes frequent close-ups and tracking shots.

There are moments in the performance when Bob's attention is not captivated by what's on stage, but he is curious about the virtual audience and so he accesses on his tablet a graphic that shows him how many others are watching. Also on his tablet is a slider that allows him from moment to moment to rate the production from 1 (dreadful) to 10 (marvellous). His slider is set somewhere around the 4 mark, but he sees that the aggregated score from the rest of the audience is above 7, so he decides that perhaps he is missing something and he focuses again on the actors. By the end of the first half the aggregated score has crept above 8, and this cues appropriately enthusiastic and noisy applause from the speaker on his tablet. Which is something of a contrast with a play last month when the rating at this point was below 3 and he heard an occasional "boo" in the tepid clapping.

At the interval Sue switches the virtual Box from message only to message and video and throws the mosaic of video images to the TV so the friends can see each other. By the end of the first half Dave had become attuned to the accents and dispensed with the scrolling script and was now using his tablet to browse the programme. The others also look through programme and chat to each other (counting the total number of episodes of Casualty in which the cast has appeared) and guessing what will happen in the second half. As they do so Helen sends a link to Bob. The link is for tickets to a production of the play they are watching that will be performed at their local theatre next spring. On the second monitor in the room the 360-degree live video shows people queueing for the white wine, which prompts Dave to open another bottle of Sauvignon.

Once again the theatre chatter from the second screen on the wall falls away and the house lights go down. The stage view replaces the video chat on the TV and the distributed group settles down in their virtual box for the second half. Towards the end of the third act there is an amazing moment in the performance when two actors deliver stirring a scene at the peak of their craft. The theatre audience rise from their seats in a standing ovation. The friends remain seated but the aggregated rating has topped 9, prompting a spontaneous burst of applause from the system. They share the moment with the theatre audience, and with the audio channel, by clapping from their sofas in recognition that they have witnessed and shared something extraordinary. They share a second standing ovation at the end of the performance and return to video chat before the group disperses until the next time. Playing out on the main monitor is the 360-degree video feed as the audience at the Apollo collect their coats and head off into the night.

3.2 Watching Theatre at Home- Market context

'Theatre' forms an important component of the European creative industries. The creative industries as a whole (which is quite broadly defined but depends strongly on the creativity and talent pool that theatre develops) forms a dynamic sector valued at about €200 billion across the EU-27 in 2011. It has enjoyed an effective CAGR of 2% since 2001. The Creative Industries have embraced ICT to develop new business models to enhance revenue and drive awareness of their brands. In doing so they generate 4.4% of the European GDP, 6.8% of value added (as a percentage of GDP) in 2011, and representing 3.8% of the European workforce.

The latest figures from the United Kingdom show that employment in the creative industries grew by 6.0% between 2011 and 2012, representing 8.0% of overall employment and 5.2% of Gross Value Added. In the EU as a whole, the creative industries account for 3.0 % of total employment (2008) and 3.3 % of GDP (2006).

Content and Creative Industries, while locally, or regionally, and/or nationally implemented or even governed, are moving to a worldwide framework, thanks to the digitalization of the value chain, from creation through distribution to consumption. This is evident in theatre where performances increase their reach not simply by longer runs, or a bigger theatre but by broadcasting live performances to cinemas and by relocating performances from the UK to other global locations. To succeed in the global game a recognised brand is essential. Historically the challenge was to create a national brand recognition that often conflated the production with the theatre venue. Thus The National Theatre was understood to be both a complex of brutalist concrete architecture on the South Bank and a type of theatre often promoting more modern productions. But the 'National Theatre' as a brand does not translate well to say France, or the US where they may well have their own National Theatre.

Broadcasting performances is an opportunity to build the brand and so aid in the successful export of UK and European theatre across the world.

The dominant market model for theatre remains live performance. The distribution of filmed theatre is a growing phenomenon with significant export potential and with an inbuilt potential to sell European culture and to encourage tourism. There is a limit to the number of credible brands that can create saleable content and a limit to the number of productions that can be proffered each year. The maximum box office revenue realised to date (for a single production) is about £2M for a production

of *Hamlet* from the Barbican Theatre with Benedict Cumberbatch (though revenues of a few hundred thousand pounds is more normal). Given that production costs are typically £300-400 and that only about 40% of the box office takings are returned to the theatre producers filming live theatre is not (usually) that profitable. However, it does serve the wider purpose of theatre brands, developing both awareness and an archival record of the theatre's output.

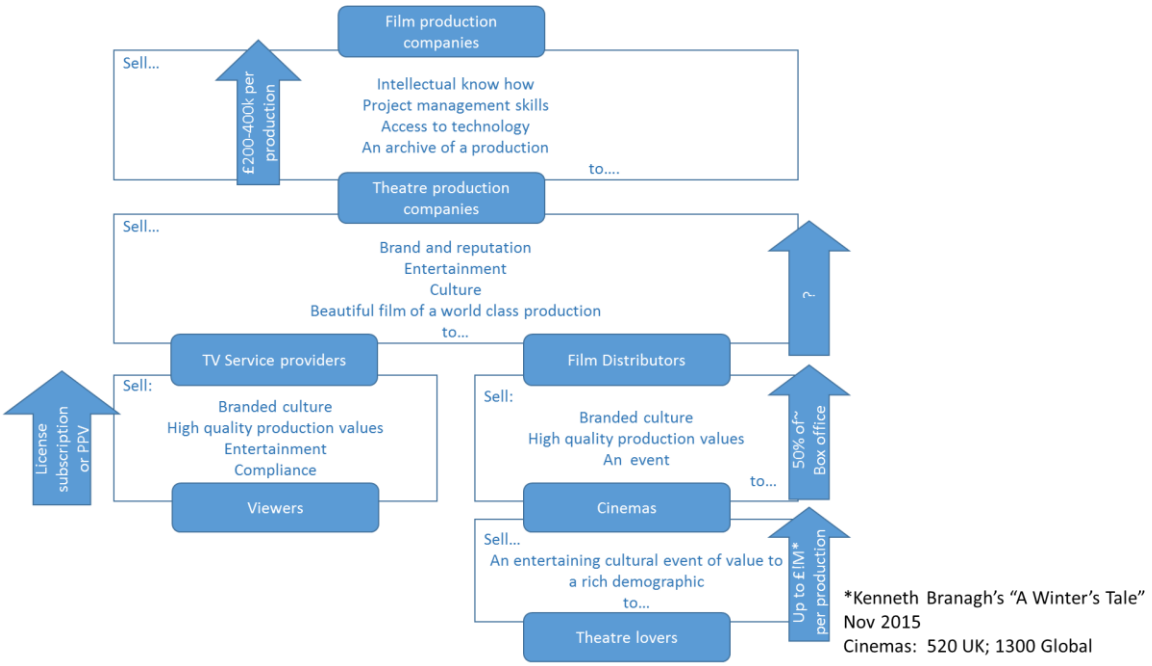


Figure 7. Value chain for the extended distribution of theatre productions.

If we estimate that the market could stand one significant production per week the UK market size (measured as box office revenue, which will be global) is estimated to be about £20-30M in 2016. Growth could be achieved through greater reach in countries outside the EU; this will come if attempts to enhance the perception of key theatre brands are successful – so far the most successful route is to use genuine A-list stars like Benedict Cumberbatch and Kenneth Branagh to promote the production.

Revenues from the sale of rights to broadcast live theatre on television are small (estimated to be much less than £1M per annum in the UK) – but this is a market that could be developed if the experience of watching theatre at home could be made attractive enough. Also the revenue is incremental against a sunk production cost and could help sustain the business model of filming live productions whilst also building brand recognition.

3.3 Watching Theatre at Home- Existing services

3.3.1 Early television and theatre

Precursors of this service can be understood as beginning with the first live television broadcasts from theatres that began as early as 1938. Writing in *The Listener* about a live broadcast from London's West End in January 1939, Grace Wyndham Goldie recorded,

> *I sat in my own sitting room the other night and watched Twelfth Night being performed on the stage of the Phoenix Theatre. And the miracle of television came home to me afresh. There was the actual feeling of being in a theatre… Now this is a great thing. Partly because it is tremendous fun to get the effect of having a night out, an evening in the stalls. Partly because*

> *it gives a curiously valuable sense of shared enjoyment, of being part of an audience and not an individual.*

Just over 75 years on, **Theatre at Home** aspires to realize the vision of "the actual feeling of being in a theatre" in terms that are appropriate to the twenty-first century.

3.3.2 Theatre and television in the 40's and 50's

There were frequent live and recorded broadcasts from theatres during the 1940s and '50s, often with introductions by critics and others, but such presentations were much rarer from the 1960s onwards as original television drama increasingly dominated the schedules. There have been only occasional theatre broadcasts on television since the millennium, including of *Richard II* in 2003 and *Measure for Measure* in 2004 from Shakespeare's Globe. On each occasion, a red-button interactive channel offering complementary commentary and information throughout the broadcast. Recently, however, recognizing the success of live cinema screening of theatre broadcast television has demonstrated a renewed interest in the form with "as live" presentations on BBC Four of *Antigone* from the Barbican and *Gypsy* from the Savoy Theatre.

3.3.3 Early cinema broadcasts of theatre

Cinema broadcasts of theatre plays were envisaged by John Logie Baird and other pioneers of early television, but it was only in 1964 that a full-scale production was presented in this way with the "Electronovision" presentation of Richard Burton in *Hamlet*. Regular cinema screenings of theatre shows, however, began in 2007 with the inauguration of the NT Live series from the National Theatre, followed by live and "as live" presentations of productions by the Royal Shakespeare Company, the Old Vic and other companies. These cinema screenings often include hosted introductions with contextual information and they may be accompanied by downloadable app-based digital programmes. They invariably prompt considerable social media activity, especially on Twitter in the interval and after the broadcast has finished.

Services already exist that offer some aspects of the guide scenario. They include television and online presentations of theatre performances and live and as-live screenings of theatre in cinemas. **Watching Theatre at Home** is intended to enhance the television and online presentations with mediated versions of the social activities associated with cinema screenings.

Television broadcasts of theatre are currently only occasionally offered in Britain by BBC Four and Sky Arts. But BBC Television is committed to extending these broadcasts, both on its terrestrial channels BBC Two and Four and also online via BBC Arts Online and with support from the recently established Arts Council England initiative The Space. Theatre performances continue to be a significant component in the Sky Arts schedules and in the channel's associated on-demand library.

A broadcast screening of a theatre performance may attract up to 1 million viewers on BBC Two and c. 300,000 viewers on BBC Four. The number of viewers on Sky Arts and online are significantly smaller.

Other online offerings include sporadic scheduled presentations via YouTube and other video sharing services from venues such as the Hampstead Theatre and from companies like Cheek by Jowl, and also on-demand streams from dedicated services including Digital Theatre and Globe Player. These dedicated services at present attract only modest audiences but they are seen by funders and other stakeholders, including Arts Council England, as key elements to increase significantly access to cultural events in geographical terms and in broadening the types of audiences who can be engaged.

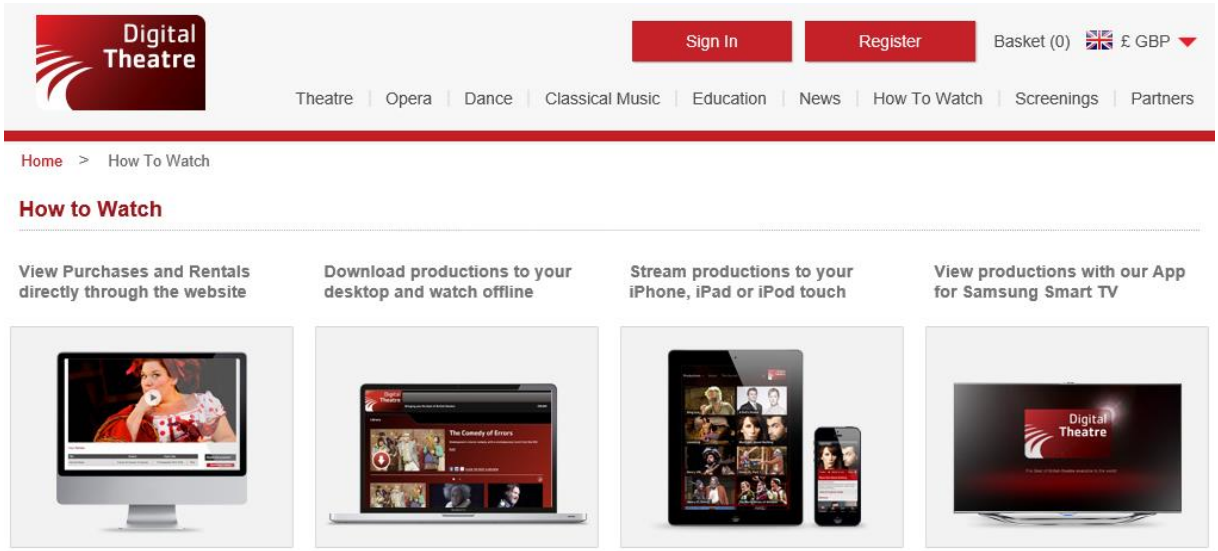


Figure 8. Screenshot from Digital Theatre's on-line access to theatre productions.

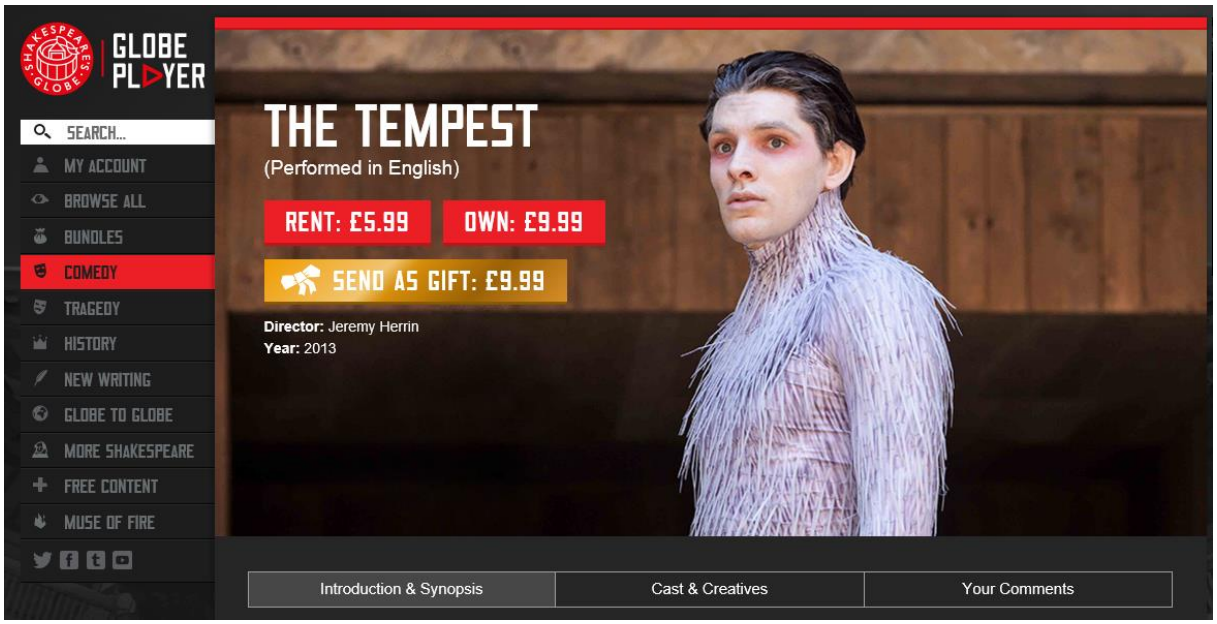


Figure 9. Screenshot from Globe Player's on-line access to theatre productions.

As media consumption fragments and the attention of viewers and users becomes ever harder for individual services to attract and keep, broadcasters and other service providers are increasingly looking to "event"-type programming to attract audiences. Such programming includes sports events as well as high-profile live entertainment shows such as *The X-Factor* and *Strictly Come Dancing* with interactive elements and extensive associated social media activity. In the USA both NBC (with *The Sound of Music Live!* as well as others) and more recently FOX TV (with *Grease Live!*) have looked to live musical performances of theatre shows to bring audiences to the channel at a specific moment and to encourage social media alongside these productions.

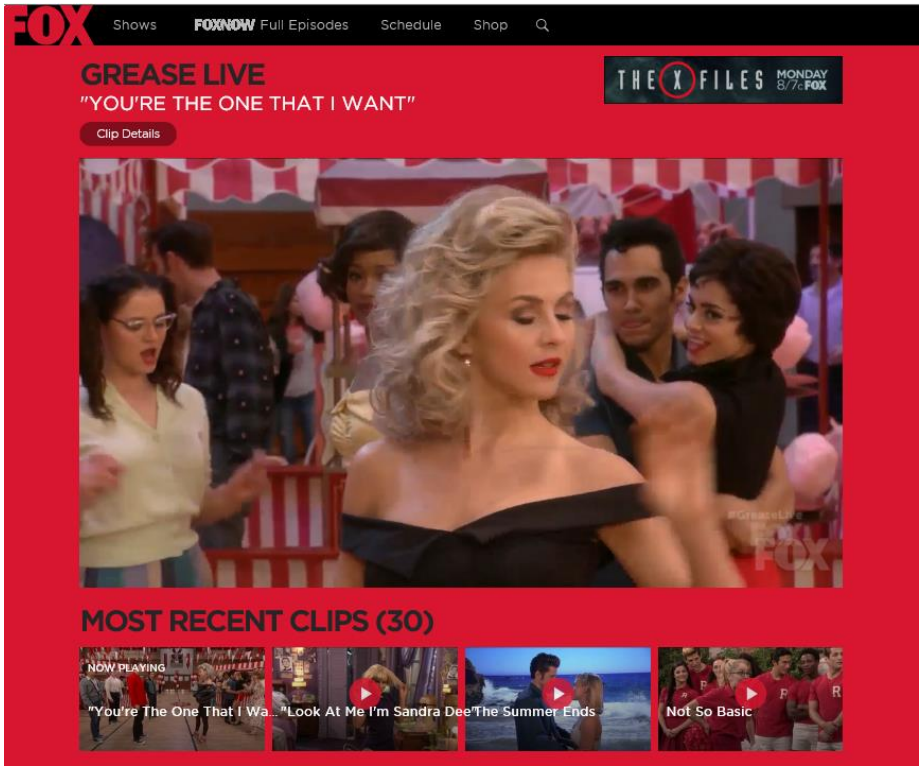


Figure 10. FOX TV's on-line live access to a production of Grease.

Key to the success of the "event cinema" presentations are the social aspects of the experience – viewing a performance in the presence of others, meeting friends, participating in a special occasion. **Watching Theatre at Home** intends to translate these fundamental social aspects to a domestic setting while retaining the sense of communality and connectivity.

Although the prototype will be focused on an enhanced experience of a play it is important to recognize that the principles and the technology will be applicable to broadcasts of other performance events including opera and ballet, popular and classical concerts, as well as other recorded media such as feature films.

3.4 Watching Theatre at Home- Prototype service description

In her home the user watches online a theatre production, shot with multiple cameras, that is either being broadcast live or is accessed as an "as live" recording at a particular moment. The production is being shown as a linear HD feed on the main screen in the room accompanied by a synchronised 5.1 audio track. She is viewing the production simultaneously with other people who are watching in other spaces, perhaps in another room in the house or perhaps on the other side of the world.

The user has a second screen device that can access synchronized information streams directly from the provider of the broadcast and from the web through social media applications including Twitter but which can also, at times, feature audio and video chat with others who are watching. These other viewers may have come together in a pre-arranged group or they may be invited to participate in these exchanges on the basis of a profile that they have previously made available to other viewers.

The main and second screens offer four different forms of experience:

1. Context: the user is offered access to information about the production in the form of text, images, audio and video. This information includes material that might be found in theatre programme, including the list of cast and creatives together with information about what they have appeared in or

contributed to previously, as well as short audio and video elements as well as text essays about aspects of the production and the play, the historical background or influences on the team that created it.

In the initial configuration it is not envisaged that elements of the second screen media streams are overlaid on the production broadcast, but this may be an option that it is implemented at a later point.

2. Channels: before and after the show, and also during the interval, the user can access a live (and potentially interactive) 360-degree video feed from the foyer of the theatre; and then during the broadcast of the theatre show itself the user can access either on the main screen or on the second screen device three synchronised streams; one of these is video of a fixed-camera wide shot (which can appear either on the main screen or the second screen device) and the full audio mix, and the other two offer optional subtitles on the main screen and audio description overlaid on the audio mix.

3. Crowd: on the second screen a graphical representation can be accessed showing how many other people are watching the theatre show at the same moment and also, if permission by others has been granted, whether any of these are in the user's contacts and/or Twitter feed. The user can also offer feedback in the form of a 1 to 10 rating at appropriate moments during the show as a scene is drawing to a close or the end of a part, and this feedback is aggregated and expressed automatically in numerical and graphical form and also as supplementary audio of applause.

4. Chatter: the combination of the main and second screens offers real-time interaction with others, primarily before the show begins, during the interval and afterwards. This main interaction is via video chat but audio-only exchanges are also available. The user can organise in advance who will be part of their group – who, in a sense, will be in their virtual "box", but she can also invite others who are known to be watching and seek to make contact with other audience members for such chats.

Initial analysis of the guide scenario yields a number of user stories for both the theatre producer and the person watching theatre at home. This is a developing list which is being used to define the technical requirements of the platform. According to the plan, the **Watching Theatre at Home** Use Case is the first to be trialled in 2-IMMERSE. For this reason this list of user stories is more developed than for the other use cases.

As a user at home	As a producer
HT001 **Before the live performance of play on TV I want to use Facebook and Twitter to make it clear to my friends and others online that I will be watching the play at home later, so that I can later invite some of them to watch the play with me.**	HT101 Before the performance I want to be able to alert users of the system about this new production, its casting and its distinctive features, so as to be able to attract users.
HT002 **Before the live performance I want to learn from Facebook and Twitter who else is planning to watch so that I can choose who to invite to watch with me.**	
HT003 **Before the live performance I want to be able invite to people to watch with me so as to share the experience of watching the performance with my friends or others.**	HT102 Before the performance I want to be able to send personalised invitations to those who have used the system before to encourage them to participate in this new experience. This is so that I can maximise the number of users and revenue.
HT004 **Before the live performance I want to be able to receive invitations to watch with others, and to accept or decline these, so that I can control with**	

whom I will be watching the performance.	
HT005 **Before the performance I want to be able to use my credit card or Paypal to purchase access to the production and its enhanced features, so as to be able to participate in the experience.**	HT103 Before the performance I want to be able to process payments via credit cards and Paypal so as to develop a revenue stream for the production.
HT005 **Before, during and after the performance I want to see and be seen, hear and be heard, by others within the group who I have chosen, and to be able to exchange private and group text messages within this group, so that we can enjoy each other's company with the performance as a focus, and to exchange ideas and reactions prompted by the play.**	
HT006 **Before, during and after the performance I want to be able to access relevant text, image, audio and video resources about the play, the production, the cast and crew, made available by the producer so that my experience and appreciation of the broadcast can be enriched and made more compelling.**	HT104 Before, during and after the performance I want to be able to provide relevant text, image, audio and video resources about the play and production before, during and after the broadcast. This is both to provide a rich, compelling experience for the home user and to add value so as to differentiate my media offering from those of competitors.

As a user at home	As a producer
HT007 **Before the performance I want to be able to access live and interactive 360-degree video and audio from the foyer of the theatre, so as to feel that I am part of the communal experience of watching the play with a physical audience.**	HT105 Before the performance I want to make available a 360 live video feed from the foyer of the theatre so that a home user can access content that mirrors the experience of arriving at a theatre and enhances the anticipation and sense of event enjoyed by those attending a physical theatre.
HT008 **Before the performance, or at any point during it, I want to be able to personalize my access to the resources available to me (in, for example, HT006, HT016 and HT020) in order to set their address to *Introductory*, *Informed* or *Expert*. This is so that I can receive materials that will best enhance my experience and understanding of the production.**	HT106 Before the performance, or at any point during it, I want to be able to facilitate personalized access to the resources that I am making available (in, for example, HT006, HT016 and HT020) so that I can offer materials that will best enhance my user's experience and understanding of the production.
HT009 **During the broadcast I want to be able to view the various media streams as below on both the main screen in the room and on one or more second-screen devices, and to be able easily to switch these, so as to achieve control over the viewing experience.**	HT107 During the broadcast I want to be able to produce, and control the available options for displaying the theatre play within the home so that I can provide the most satisfying communal simulation of theatre-going for the user – and in this way attract her to revisit the experience in the future.
HT010 **During the broadcast I want to be able to see a**	HT108 During and after the broadcast I want to be able to

graphical display of how many other home viewers are watching at any moment during the broadcast, so that I can appreciate and enjoy being part of a simultaneous communal experience.	access detailed analytics about those who are watching, where, on what devices and for how long, so that I can understand the behaviour of the users and – potentially – refine future offerings to make them more attractive.
HT011 **During the broadcast I want to be able to rate on a scale of 1 to 10 my current assessment of the production, so that I can express my developing responses and feel that I am contributing to a communal assessment.**	
HT012 **During the broadcast I want to be able to see an aggregated total of the ratings of all those who are watching simultaneously, so as to monitor and assess the responses of the audience and to measure my own responses against the broader view.**	
HT013 **During the broadcast I want to be able to choose to view either the broadcast mix coverage of the production being created by the screen director or to view a static wide shot of the stage or both. This choice will allow me to experience the broadcast in a "purer", less mediated or narrativised form.**	HT109 During the broadcast I want to be able to offer the full mix as created by the screen director and a static wide-shot of the whole stage, so as to allow users to toggle between these and so achieve a more inclusive understanding of the production.
As a user at home	**As a producer**
HT014 **During the broadcast I want to be able to view synchronised sub-titles for the production, either on a second-screen device or overlaid on the main performance feed. If I am hard-of-hearing I want to do this to enjoy the broadcast fully; and if my hearing is good I may want to do this if I find the language of the playwright (e.g.. Shakespeare) unfamiliar and a bar to achieving a satisfying understanding.**	HT110 During the broadcast I want to be able to offer synchronised sub-titles so as to enhance the experience for the user.
HT015 **During the broadcast if I have restricted sight I want to be able to access synchronised audio description for the production, so as to understand and appreciate fully what is being shown.**	HT111 During the broadcast I want to be able to offer audio description so as to enhance the experience for the user.
HT016 **During the broadcast I want to be able to access synchronised information and commentary in the form of image and text created by the producer, so that these elements can enhance my viewing experience, deepening my engagement and understanding.**	HT112 During the broadcast I want to be able to offer synchronised information and commentary (created in a cost-effective manner before the production) so as to enhance the experience for the user.
HT017 **During the performance I want to be able to use**	

Twitter from my second-screen device so as to contribute to an unfolding discussion of the production and to view similar contributions by others. This is so that I can feel engaged in an active and developing discussion, which may be light-hearted or serious, of the production.	
HT018 **During the performance I want to be able to access synchronised subtitles (cf HT013) and/or synchronized text commentary (cf HT015) and/or comments via Twitter (cf HT017) on either my second-screen device or as overlays on the main screen or as elements on the main screen with the main image inset so that my viewing experience can be as flexible and as responsive as possible.**	
HT019 **At scheduled moments during the performance (such as towards the ends of scenes) I want to be able to express my approval of the production and have that approval aggregated with that of others who are watching and displayed as audio (such as applause) or in a visual form. This is so that I can feel I am participating in the full social and communal experience of experiencing a play.**	HT113 At scheduled moments during the performance I want to be able to feedback the approval expressed via HT019 to the performers, either in an audio or visual form, so as to provide them with an understanding of those who are watching and their appreciation of the show.

As a user at home	As a producer
HT020 **During and after the broadcast I want to be able to contribute text comments about the production, so that I can share my knowledge and responses, and I want these comments - after moderation by the producer – to be preserved in a layered structure that be accessed synchronously with the "as live" video on demand offering of the production.**	HT114 During and after the broadcast I want to be able to moderate the text comments about the production, so that I can control these comments and create a lasting version that can continue to be enhanced.
HT021 **At any point after the live broadcast I want to be able to access an "as live" recording of the broadcast with the functionality of many of the URs already specified. This will allow me – if I have missed the live broadcast - to recreate many of its elements at a time that is convenient to me.**	HT115 At any point after the live broadcast I want to be able to provide to users an "as live" recording of the broadcast with the functionality of many of the URs already specified. This will allow me to further maximize the number of users and the revenue for the production.
HT020 **After the broadcast I want to be able to offer feedback to the producer about any and all aspects of the production, and to know that feedback has been communicated, so that I can feel I have an involvement in the shared experience of the production.**	HT116 After the broadcast I want to be able to receive feedback from users about any and all aspects of the production, to acknowledge their comments, and to communicate individually and collectively with them both about this production and those in the future..

Table 1. Potential use cases for a Theatre at Home service pilot.

Theatre at Home, as its names suggests, is offered to users in a domestic setting.

The users are envisaged as a broad cross-section of the general public with an interest in theatre with general tablet and social media literacy. They will experience the service in a room equipped with one or more large-screen monitors and multiple tablets or other hand-held second-screen devices.

3.5 Watching Theatre at Home - Frequency

The service is envisaged as offering a live broadcast on a regular basis, perhaps once a month, but also importantly as being available as an on-demand service to which other users can be invited to schedule a collective viewing.

3.6 Watching Theatre at Home – Social context

The context for the experience is expected to be a time at which the user has dedicated a significant period of time, lasting perhaps two to three hours continuously. The user will either fit in with a schedule determined by the producer or broadcaster, or will schedule an "on demand" presentation that may coincide with the interest and availability of others who may be known to the user or may simply have expressed an interest in watching the presentation with others.

The broadcast may be watched by an individual who is alone in a room or by a small group who are physically together. It is expected that during the presentation of the theatre show itself, focused attention is being given to the main screen, with the second screens offering limited and subsidiary elements. The full range of second screen elements, including audio and video contact with other remote users will be available only before and after the main show, and during any intervals.

3.7 Watching Theatre at Home - Evaluation plan

The first trial(s) of the **Watching Theatre at Home** prototype are not tied to specific dates or events but can be scheduled by 2-IMMERSE as is appropriate. We expect to work with pre-existing content which means that we can have flexibility with scheduling, but it is currently envisaged that the first trial(s) will take place in Autumn 2016. The precise date depends upon the availability of a suitably capable technical platform. The plans for building the platform are being developed in parallel with these service innovation ideas. Current plans are for evaluation results to be available in January 2017.

The initial trials are expected to involve users in 10-12 domestic locations, with some participants watching as individuals and others gathered in small groups. We expect these users to participate by viewing and interacting with a full presentation of a complete production across two to three hours. In addition to testing and evaluating the technical operation of the platform and its components, we intend to work with the participants to evaluate the social and aesthetic aspects of the experience.

This evaluation process will include observation of the participants during the experience, monitoring and analysis of user behaviour as captured by the system, personal interviews immediately after the experience finishes and also the completion of questionnaires intended to detail the advantages and added values of the system as well as its limitations and problems. Time and resources permitting, we intend to use this detailed evaluation to contribute to an iterative development process that can facilitate later trials, as well as informing the prototype development for the other 2-immerse use cases.

4 Prototype Service 2 – Theatre in School

Watching Theatre At School

This service innovation is called **Watching Theatre in School**. This service enables pupils in schools across the country to watch a filmed performance of a play in a production by the Royal Shakespeare Company. Pupils are able to augment the main filmed presentation of a play with access to related supporting content and experiences to help them deepen their understanding of the play. This related content may include a synchronised transcript of the play, character summaries, short films featuring the talent in the play and even live communication session with the actors and other creative talent associated with the production.

Owner: John Wyver (Illuminations) **Rights Originator**: Royal Shakespeare Company

Figure 11. Overview of Theatre at School service pilot.

In the following guide scenario which is written to help the reader picture the service innovation prototype we introduce **Samra**. Samra is 17 and lives in Dalkeith just south of Edinburgh. Samra is studying English, Drama and History at A level and attends her local High School. Samra hopes to study Drama at college and dreams of performing in the West End.

4.1 Watching Theatre In School – Guide Scenario

Figure 12. An example of a classroom set up for a Theatre at School scenario

Samra is looking forward to school this morning. Her A' level class is going to see David Oyelowo in the Royal Shakespeare Company's new production of Hamlet, except they don't have to go from Edinburgh to Stratford, because the live cinema broadcast that was shown in cinemas two nights ago

is being screened online at school. The free stream is going out to more than 400 schools around the country, including a school in Exeter that Samra's class visited last year, where there is a class that is also studying Hamlet.

In the half-hour before the broadcast itself starts, Samra's teacher and her counterpart in Exeter lead an introductory chat about the play and the production in a Google+ Hangout for both classes. On the main screen in her classroom Samra can see a mix of graphics with information about the play and shots of the audience settling down in the theatre. But via her tablet, Samra is contributing, by typing, to the discussion being shaped by the two teachers. Ten minutes beforehand she chooses a video stream on her tablet so that she can listen to an introduction from the production's director, although she is also tempted by a parallel stream that her friend Cathy is watching with David Oyelowo talking about the role of the Prince. She saves a link that will let her watch this later.

As the play begins on the main screen, her tablet offers both a text commentary on the play that unfolds in sync, as well as a text chat box for just her class and the one in Exeter. From time to time Samra uses this to ask a question of both teachers. Come the interval, almost everyone goes back into the hang-out, although Cathy chooses a separate channel to talk with a Professor Stanley Wells from the Shakespeare Birthplace Trust. Professor Wells has been watching as well, and he has come online as arranged to talk with a small group (the hangout is restricted to 12) about his sense of the production. This exchange and a dozen others with experts are recorded and again available on demand as soon as the performance is finished.

Samra hopes to study Drama at Bristol and she's very interested in how a stage manager runs a production. For part of the second half she accesses through her tablet, as an overlaid audio stream, the cues to the lighting and sound departments and to the cast that the Stratford stage manager gave as the show unfolded. She keeps an eye on the text commentary and the chat as well, although she finds she is drawn into the plight of the Prince and simply wants to concentrate on the amazing performances. As the cast come on for the curtain call the shared video channel flicks back on and her friends share their pleasure and applause with the class in Exeter. In addition to talking with the class where she is sitting and the one in Exeter, Samra can now try to go back to the seminar group with Professor Wells or she can listen to the production's director responding to questions submitted via text chat. Three or four of the cast are sitting in the Green Room in Stratford, and there's a hangout with them too. If she's not careful she'll miss the last sitting for lunch, but at least she knows she can log in to recordings of all of these when she gets home tonight.

4.2 Watching Theatre in School - Market context

The market context here is less of a commercial concern and more about the ability of the service to further the aims and purpose of the provider. In this instance we are developing a relationship to work with the Royal Shakespeare Company (RSC). The RSC is dedicated "*to making the finest theatre productions of Shakespeare's plays, as well as other plays written when Shakespeare was alive or soon after and plays being written right now.*" Complementing this aim is the concern to develop audiences of all kinds, of all ages and in all contexts for Shakespeare, including in the classroom and other educational contexts: *"We encourage everyone to enjoy a lifelong relationship with Shakespeare and live theatre. We reach 530,000 children and young people annually through our education work, transforming their experiences in the classroom, in performance and online."*

As a consequence, the RSC has a strong and committed interest in creating engaging and compelling experiences that help young people discover and enjoy Shakespeare. To do that in school time necessitates also serving the goals of a fairly tightly prescribed curriculum. The RSC works closely with schools to achieve this; broadcasting plays "as-live" into schools is part of that outreach and if multi-screens can help to personalise and improve that experience for schools and pupils the RSC will

be pleased to explore such options in detail, developing pilots into their ongoing activities if the additional value derived is commensurate with any additional effort.

Along with the National Theatre, the RSC is a market leader in the provision of theatre-based educational services, and demonstrated success with this project would be watched with great interest by other performing arts organisations in Britain and internationally. We believe that services developed as part of this prototype could be emulated by the education departments of other theatre companies as well as those working with dance, opera, musical theatre and other performing arts.

4.2 Watching Theatre in School - Existing services

4.2.1 Schools television

Television broadcasts to schools in Britain, following a pattern established by radio in the post-war decades, began in the late 1950s. Both the BBC and ITV made programmes especially for screening in the classroom, and in the early 1960s these included abridgements of a number of classic theatre plays including the Greek drama *Philoctetes*, Shakespeare's *Romeo and Juliet* and *Hamlet*, and John Arden's anti-imperialist parable *Sergeant Musgrave's Dance*. These broadcasts were often complemented by introductory discussions and by printed teachers notes made available by the broadcasters.

Dedicated broadcasts for schools, including of theatre plays, continued through the 1970s and 1980s, although they were increasingly confined to the early morning periods as broadcasters expanded their mainstream offerings through the day. They declined from the late 1980s onwards, to be replaced in part by the use of first VHS recordings of classic plays and then later by DVDs and, more recently, online access to recordings.

4.2.2 Use of off-air recordings in schools

In Britain the 1988 Copyright, Designs and Patents Act included a provision to permit schools and other educational establishments to record broadcast programmes off-air and use the recordings in formal lessons. Many schools took advantage of this provision, including videotaping theatre plays for use in literature, drama, history and other lessons.

This provision was later extended by the ERA Licensing Scheme which permits staff at educational establishments to copy, access and use, for non-commercial educational purposes, broadcast output of ERA's members. Working within the provisions of the ERA License the non-commercial organisation Learning on Screen, as well as a number of commercial providers, facilitate online access to broadcast programmes from 1988. A number of recordings of theatre plays are included in this framework and are used for teaching by a range of schools and other educational institutions.

4.2.3 Current dedicated services for Watching Theatre in School

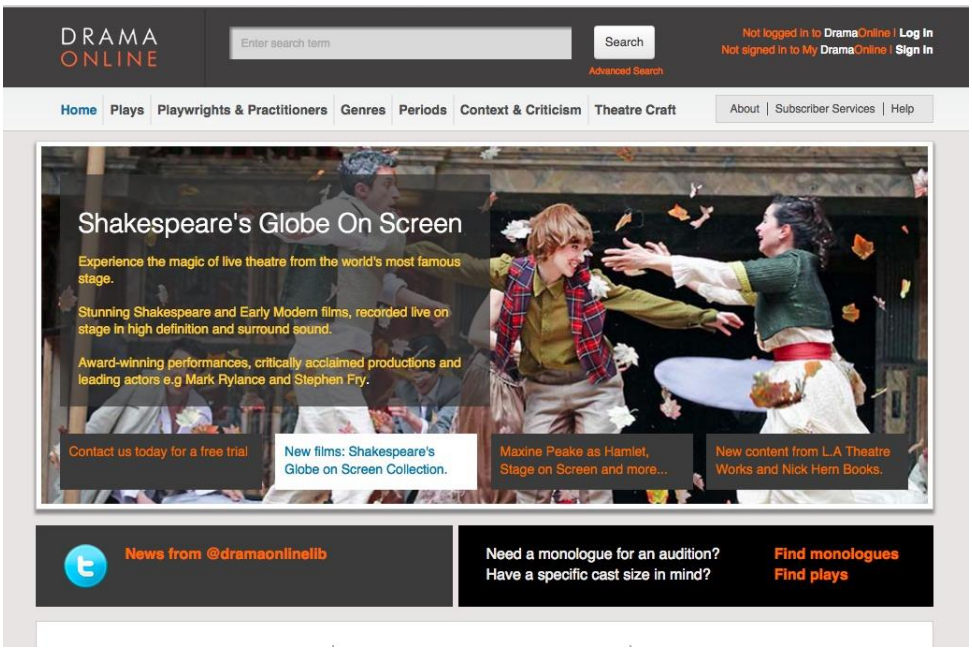


Figure 13. Screenshot from the Drama Online service

The online schools service Drama Online, available via subscription from Bloomsbury, Methuen and Faber & Faber, offers elements of the envisaged service, with a limited range of video elements at present, with little integration of video with text and no effective annotation tools.

The Drama Online video library [1] offers subscription-based access to recordings of productions from Shakespeare's Globe and the Stage to Screen project as well as individual productions such as the Manchester Royal Exchange staging of Hamlet with Maxine Peake. But Drama Online remains at heart a text-based service containing 1200 plays together with stills from the V&A and The American Shakespeare Center.

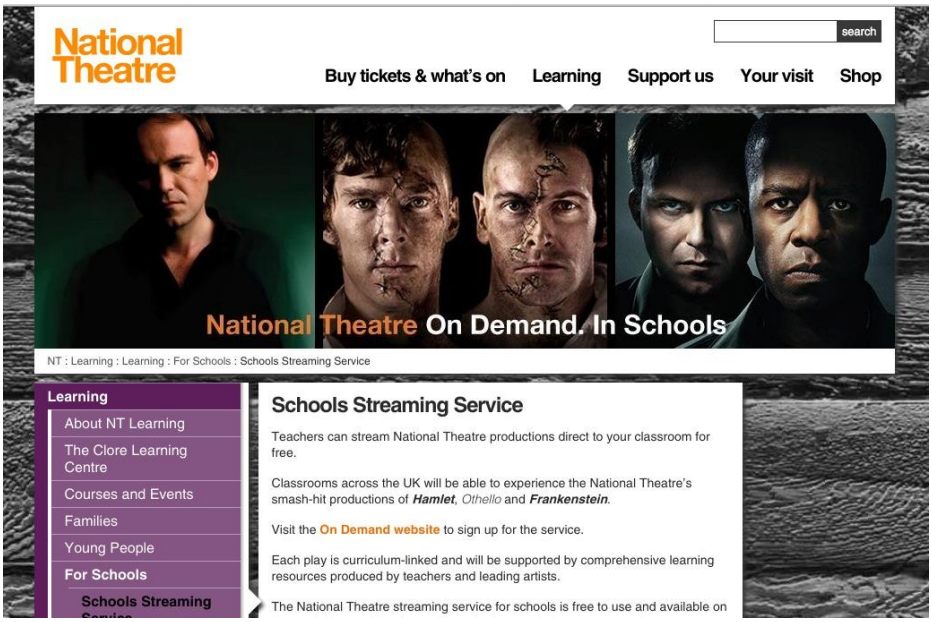


Figure 14. Screenshot from the National Theatre's school streaming service.

NT Live offers three of its recorded productions – *Hamlet*, *Othello* and *Frankenstein* – as freely accessible streams to UK schools. These are chaptered and accompanied with educational resources. *Treasure Island* and *The Comedy of Errors* are to be added to the service later in 2016. The recordings were made for the NT Live cinema broadcasts and were recorded in high definition in front of live theatre audiences. And as the National Theatre's website explains [2], the service is part of the National Theatre's mission, as a publically funded institution, to increase access to the arts, extend reach and provide young people with opportunities to engage with the best of British theatre.

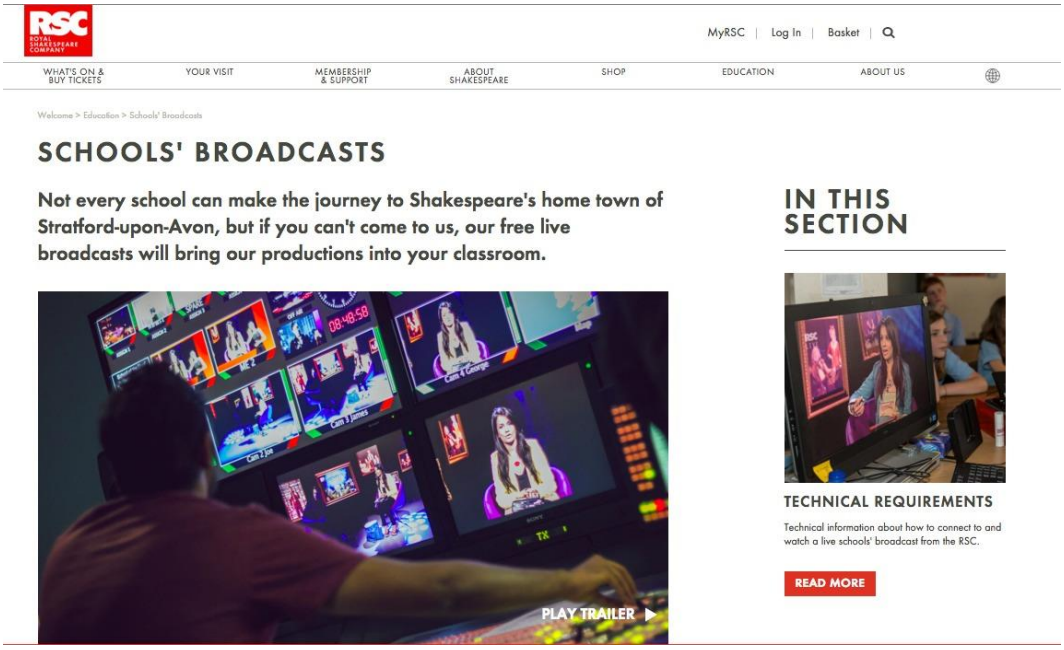


Figure 15. Screenshot from an RSC school broadcast.

RSC Education [3] presents a scheduled Schools broadcast of each of the RSC Live from Stratford-upon-Avon recordings, which are available to all schools throughout the UK. These scheduled streams are accompanied by tailored live introductions and follow-up Q&A sessions responding to questions submitted via Twitter. Further details of this service and its rationale are included in 4.3.3 below.

4.3 Watching Theatre in School - Prototype service description

The prototype will develop many of the capabilities of the **Watching Theatre at Home** service and apply these to a classroom setting, both for watching and engaging with a full performance presented in real time and for using the capabilities to analyse limited sections of the performance in the context of more focused sessions. The prototype will be developed in conjunction with and take advantage of the platform developed by students at Ravensbourne College of Art for the provision to schools of the broadcast stream and associated services.

4.4 Watching Theatre in School - Location

The service is intended to be used primarily in the classroom, but there is also the option for students to access a limited version of it at home.

4.5 Watching Theatre in School - Frequency

Watching Theatre in Schools would be used as part of the curriculum in the teaching of English, Drama, Theatre studies and other related subjects. We presume that this educational approach could be used about once per year for appropriate year groups and that each time it is used it may take up 1-3

lessons. Sometimes schools may set aside a whole afternoon and make an event of the broadcast but equally or perhaps more likely is that the presentation would be edited such that it can be presented in lengths that fit within the normal lesson time.

4.6 Watching Theatre in School - Social context

Detailing their rationale for their current service offering streams of recorded theatre productions, RSC Education write: *"The new curriculum for KS3 means that students are required to study two Shakespeare plays; we know that one of the best ways to experience Shakespeare is to see it live [and we believe] our Schools' Broadcasts are transforming young people's attitudes towards Shakespeare."*

The planned prototype is intended to enhance this invaluable experience of seeing Shakespeare live and as a consequence deepen and enrich young people's attitudes to Shakespeare and the other performing arts.

4.8 Watching Theatre in School - Evaluation plan

Our intention is to work with the Royal Shakespeare Company to develop an initial trial with at least one secondary school in the spring of 2017. The school will be chosen in conjunction with the RSC and will be one where previous RSC schools broadcasts have been presented.

Evaluation methods for the trial will include, in addition to the technical monitoring of the service and its uses by both pupils and teachers, observation of the prototype being used by teachers and pupils, interviews conducted immediately after the trail and also questionnaires intended to identify which aspects of the service were regarded as valuable and productive, what usability issues became apparent, and what failings the prototype might have. An initial evaluation report drawings on these sources is intended to be ready for publication in the autumn of 2017.

5 Prototype Service 3 – MotoGP at home.

Watching MotoGP at Home

This service innovation prototype is called 'MotoGP at Home'. It is an example of Multi Screen Motorsports. MotoGP at Home will provide a user with a personalised experiences that can be controlled to suit a viewer's interests/experience with the sport. This was selected as the primary motorsport use-case as it offers access to a broad selection of real-time video, audio and data feeds. BT sport has an existing commercial relationship with Dorna, the MotoGP rights owners, who have agreed to be an associated partner within the project.

The MotoGP at home service innovation prototype will allow video footage and telemetry data to be displayed on a mixture of a large TV and on smaller personal screens. The trials with consumers will take place in multiple sites. Research insights will be captured from device/service instrumentation and follow-up qualitative questionnaires and interviews with trialists. We also plan to carry out VIP demos that could be held both at the track and at other VIP locations (BT Centre, BBC, Cisco, etc.).

The trial will focus on the Great Britain MotoGP race (September 2017).

Owner: Andy Gower (BT) **Rights Originator**: Dorna Sports

Figure 16. Overview of the MotoGP service pilot.

In the following Guide Scenario, which helps the reader to picture the proposed Service innovation prototype, two people are mentioned. They are the father and son Andy and Matthew.

Andy (Aged 36) has been a MotoGP fan for the past decade or so. He is very knowledgeable of the riders, teams and the different tracks. Andy is a diehard Valentino Rossi fan. He has previously used the MotoGP VideoPass app which gave him access to news, stats and live multi-screen race feeds.

Matthew (Aged 12) is a relative newcomer to the sport. He gets excited when watching the race, but wishes he could better follow the race action. Sometimes he finds it difficult to understand which riders are on which bikes. Matthew however is quite keen on the young Marc Marquez.

5.1 Watching MotoGP at Home - Guide scenario

Figure 17. An example of a living room set up for a MotoGP scenario

Andy is watching MotoGP at home with his brother Matthew. Andy is fortunate enough to own a large screen 65" UHD TV and a tablet which he regularly uses while watching TV. Matthew also likes MotoGP and is a keen multitasker who regularly uses his smartphone when the TV is on. Andy has been a MotoGP fan for the past decade or so, while Matthew is a relative newcomer to the sport. Andy is a diehard Valentino Rossi fan and whereas Matthew is keen on the young Marc Marquez, the recently crowned MotoGP championship winner.

The system is aware of the TV and of Mathew smart phone and Andy's tablet.. Andy switches the TV channel to watch MotoGP. The race is about to start, with riders just starting the final warm-up lap. The leader board occupies the top left of the screen, but has rescaled itself to suit the size and resolution of the large-screen TV so making more screen space available for other content which can be overlaid on top of the main programme . An overlay on the TV prompts Andy to extend the experience to local personal screens. Andy accepts the invitation.

User Profile information previously created is used to customise what appears on their respective screens. Device capabilities are understood and are taken into account to deliver a responsive and synchronised viewer experience. The content presented on their small screens is personalised. Andy's tablet shows a live video feed from Valentino Rossi's on-board bike camera that is synchronised to the display on the big TV. His tablet also shows an overlay which shows Rossi's bike telemetry; this matches Andy's interest in Rossi and the level of detail he's interested in as a committed fan. Matthew's smartphone on the other hand provides more general information about the riders and for which teams they ride. As the commentators follow the action and discuss the race, individual riders are highlighted on his phone, helping him to learn who they are talking about as he watches the race. Andy wants to see more detailed split timing data and so 'virtually pushes' Rossi's Bikecam to the TV, to make space on his tablet screen. Video from the BikeCam disappears from his tablet and reappears on the TV as a picture-in-picture positioned in the bottom corner of the screen.

As the race unfolds, Marc Marquez is involved in a crash. Previously, Andy has configured the system to show action replays on available extended screens. After only a few seconds a replay is made available, which appears as a notification on Andy's tablet and an instant 'pop-up and play' on Matthew's smartphone. It's takes a further 30 seconds or so for a convenient break in action on the main programme feed shown on the TV, before they are able to cut to the replay of Marquez's crash.

Half-way through the race Andy receives a notification on his tablet to place a spot bet on who will win the race. A synchronised alert also displayed on the TV, so that he doesn't miss the notification on his tablet.

5.2 Watching MotoGP at Home - Market Context

The Spanish company Dorna Sports are the rights owners and event organisers for MotoGP. Dorna sell rights to view the spectacle across the globe to TV service providers, they receive ticket receipts at race circuits and they sell their own app allowing people to view races directly. The following value chain approximates the market in which they operate. Little is made public about the relative value of their three main sources of income.

Dorna Sports provide services with significant global reach [4], [5].

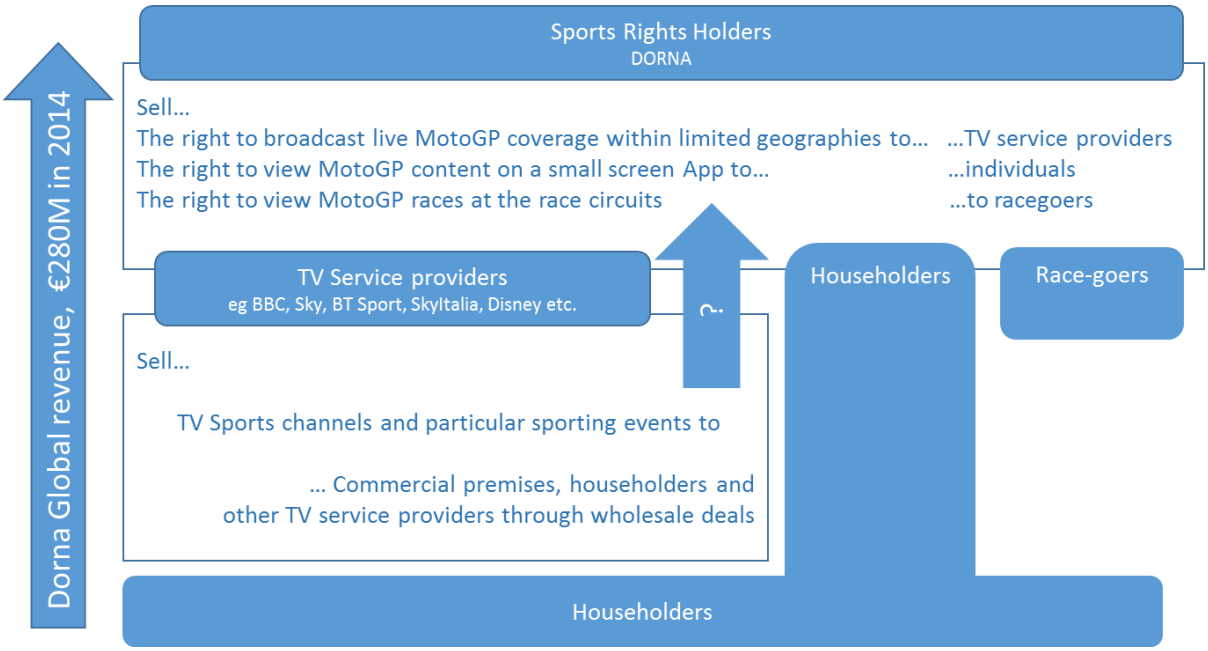


Figure 18. Value chain for distribution of MotoGP.

In 2010 MotoGP became the second largest motorsport in the world [6] reaching 233 million households worldwide in 207 countries. The 2015 MotoGP™ season reached a record broadcast coverage across the globe with 87 networks in 207 territories showing the full 18-races.

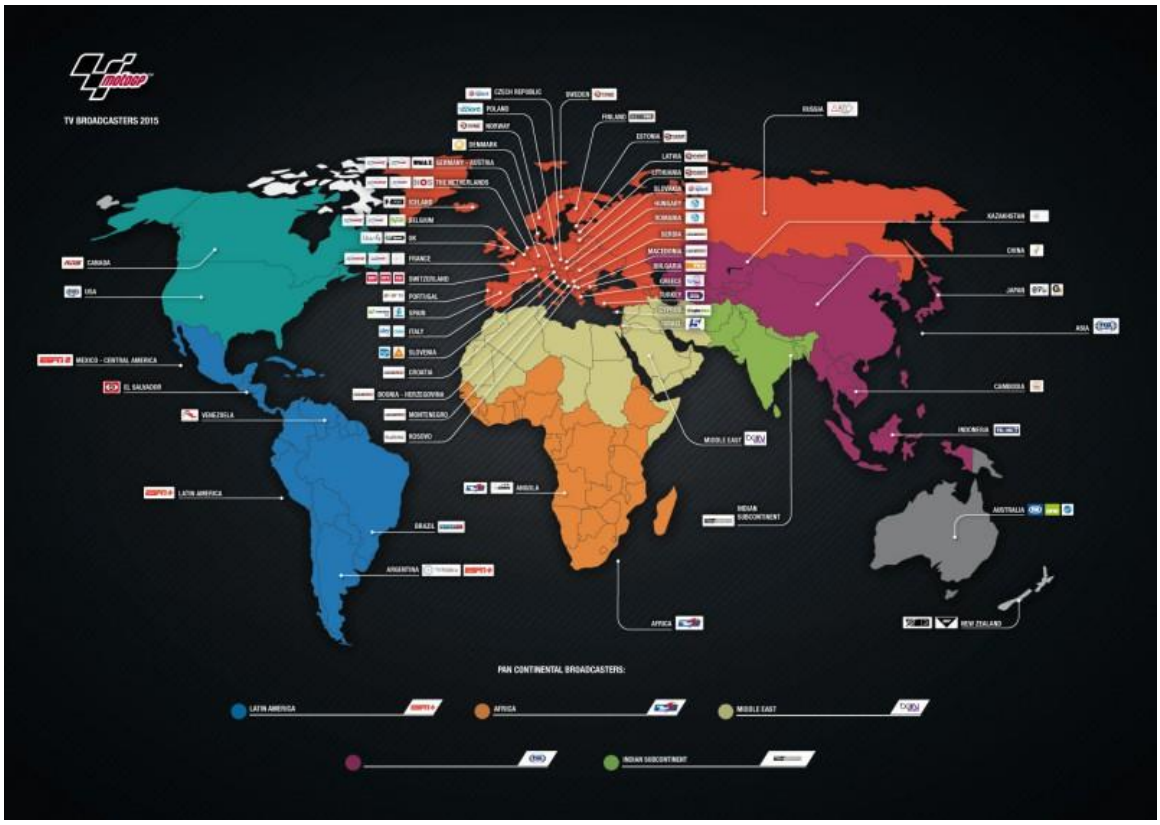


Figure 19. The global reach of MotoGP.

5.2.1.1 Europe

In both France and Germany, Eurosport Discovery has increased its MotoGP™ offering across numerous areas, offering a fully personalised programme with full coverage of every session and race throughout the weekend. This includes its commentary team, as well as dedicated pit-lane and paddock presenters along with camera crews giving the full MotoGP experience. Eurosport Germany will show nine of the 18 races on its free-to-view channel, whilst the other 9 races, as well as the practices of all rounds will appear on its pay channel Eurosport 2. And the first MotoGP Race of the season will also be available on DMAX in Germany.

Eurosport France will have a similar arrangement, splitting races and sessions between its free and pay channel. New in 2015, the country's NT1 channel will also offer a free-to-air highlights programme after every GP. In Belgium, French-speaking viewers will be able to watch all MotoGP and Moto2™ races live on RTBF 2, whilst Flemish speakers will have the option to watch the races on Eurosport.

Rounding out Eurosport Discovery's involvement is its presence in the Netherlands, where a team of commentators bring audiences every session from practices through to the race for all categories at all 18 rounds. For the very popular local TT Assen race, free-to-air channel NOS will provide Dutch audiences with all three races live, whilst for the remainder of the year it will show highlights of the other rounds in its Studio Sport programme.

Spanish audiences will have access to the 24/7 MotoGP channel from pay TV provider and local telecom giant Movistar, featuring coverage of the entire weekend with a substantial on-site presence featuring a purpose-built track-side studio. The country's free-to-air channel Tele5 will be showing

eight live races – Austin, Jerez, Catalunya, Sachsenring, San Marino, Aragon, Malaysia and Valencia – with the rest shown on Same Day Delay (SDD).

Portugal's SPORTV will feature all races, as well as a preceding practices for the entire season.

Italy follows a very similar model to Spain, with SKY Italia offering a dedicated 24/7 MotoGP channel with live studio track-side coverage, whilst free broadcaster Cielo will show eight races live, including Mugello, Indianapolis, Brno, Silverstone, San Marino, Aragon, Motegi and Valencia. For the other rounds it will offer a SDD two-hour highlights programme.

British audiences will continue to benefit from BT Sport as its pay TV provider for a full and extensive live coverage from all 18 races throughout the whole weekend, while free-to-air broadcaster ITV4 will retain its 52-minute highlights programme on Monday evenings after the race.

In Cyprus the MotoGP coverage will be provided (until at least the end of 2016) by Cypriot Telecommunications Authority CYTA on its IPTV Cytavision premium sports channel Sports Plus. Whilst in Turkey, MotoGP will continue to be broadcast on the DSmart platform.

Greece will show all practice sessions as well as the races on OTE Sport, whilst both Montenegro and Macedonia will broadcast all QPs and races live on SportKlub, the same channel that will be aired in Serbia, Croatia and Bosnia. In Kosovo, Kujtesa Sport will be showing all qualifying practices and races live.

Bulgarian satellite TV, internet and mobile provider Bulsatcom will air the MotoGP Race live on its TV+ channel, whilst providing qualifying for all three classes either live or on SDD. In Slovenia, POP PLUS will show all qualifying practices and the Moto3 race live, whilst Kanal A will broadcast the MotoGP and Moto2 races live, with Moto3 highlights. Romanian audiences can enjoy races from all three classes live, in addition to their preceding qualifying sessions on Saturday in DigiSport, which will also broadcast in adjacent Hungary.

In Switzerland, all three Swiss Public Television channels TSR, TSI and DRS show Moto2 races live, with TSR also showing MotoGP, and the Italian-speaking TSI showing all three races including Moto3.

Czech fans are able to watch MotoGP on Nova Sport, where all the races and qualifying practices will be shown live for the full 18 events.

In Poland there is a similar coverage on TV channel Polsat, which will show the live races of all classes, including the MotoGP qualifying practice. The same arrangement exists on VIASAT, which serves Denmark, Sweden and Norway. Heading further south to Latvia, Lithuania and Estonia sees MotoGP on VIASAT's Motor channel after a one-year deal was reached to show all the races and qualifying live.

In Finland Nelonen Sport Pro will show all three races live on Sunday, as well all qualifying sessions from Saturday. Icelandic fans can watch the 18 MotoGP races throughout the year on local channel Sport2.

Russian audiences will get to watch all of the live races as well as the preceding qualifying sessions on local channel Autoplus.

In Israel, channels 5 SPORT and 5SportHD have extended their deal until the end of 2017 to also show live MotoGP QP and races.

5.2.1.2 Asia & Oceania

The popularity of the MotoGP championship has been growing drastically in the Asian region over recent years, which the ever-increasing range of TV coverage reflects.

Cross continental network Fox Sports Asia, which covers countries including Singapore, Malaysia, Vietnam, Thailand, Taiwan and the Philippines, will continue broadcasting all of the races live, as well as their preceding qualifying sessions.

Trans7 continues to provide MotoGP in Indonesia with live premier-class race and qualifying coverage. In addition to this, the up-and-comers from the Moto2 race will also gain support from the enthusiastic nation, as the channel will be showing the races live ahead of the main spectacle.

In Cambodia, local channel Hang Maes TV will offer a delayed 52-minute highlights programme on each MotoGP weekend.

Japanese viewers will get a boost from 2015 in a new three-year deal, with G+ offering all QP and races live. NTV on the other hand will show the local MotoGP race in Motegi live, and the other 17 on a SDD basis.

India's Ten Sports will broadcast live QP and races in a new exclusive agreement, whilst Kazakhstani fans can enjoy their MotoGP favorites on STV, which will broadcast every premier-class race live. China's Guangdong TV will also bring the MotoGP race live or on a delayed basis.

Fox Sports Australia will be bringing all qualifying practices as well as races live on Fox Sports 5. Channel ONE will offer all premier-class races live across the entire season, and Network Ten will add coverage of Phillip Island qualifying, as well as the two races on Sunday.

New Zealand's Sky Sport channel will bring the excitement of racing to the North- and South Island with the full package of practice sessions through to races for the 18-round spectacle.

5.2.1.3 America

Across the Pacific it remains a Fox theme as US channel Fox Sports 1 will continue to broadcast every MotoGP race live, the Moto2 race on SDD and a delayed Moto3 race. At the US Grand Prix however there will also be live or SDD MotoGP qualifying.

Canada's RDS will broadcast the MotoGP race live in French, as well as the support classes as delayed highlights. In addition to this, new channel WSTV has shown the premier-class races live in English from May 2015, including additional programming such as re-runs and 52-minute highlights.

Central and South America has a similarly exciting race coverage, with Argentina's ESPN+ offering both the MotoGP and Moto2 races live, as well as a variation of live, SDD and delayed Moto3 race coverage. A similar arrangement exists for MotoGP QP, which will either be shown live or on SDD. In addition, free-to-air broadcaster TVP (TV Publica) will show the local race in Termas de Rio Hondo live.

Globosat and Sport TV will keep audiences happy in Brazil as the channels continue to show the entire race schedule from Moto3 through to MotoGP, as well as live premier-class qualifying. Venezuela's Meridiano will also broadcast all the races live, whilst El Salvador's CH4 will do the same, albeit with some on SDD.

In addition to the country-specific broadcasters, continent-wide channels ESPN Latin, ESPN HD and ESPN2 will offer the same package as its ESPN+ package in Argentina.

5.2.1.4 Middle East & Africa

In the Middle East, continental network beIN Sports will broadcast all MotoGP qualifying practices and races live across the region.

Africa has a similar continent-wide agreement with SuperSport, which will offer all three races and QPs live.

Angola on the other hand has its own offering from Zimbo TV, which will offer the each one of the 18 MotoGP races live.

5.2.1.5 Multiscreen

The extensive world-wide TV coverage also includes Dorna's MotoGP Multiscreen offering, which streams signals from varying cameras on- and around the track, including OnBoard footage during sessions. Using internet platforms, mobile apps, as well as adding this to their TV coverage are Sky Italia, Movistar, Telecinco, Nelonen, BT Sport, Ten Sports (India), NTV, as well Eurosport Discovery and Fox Sports in their cross-border coverage

5.2.1.6 UK

In the UK BT have acquired the exclusive live TV UK rights from Dorna for 5-years (2014-2019). ITV4 will continue to broadcast MotoGP race highlights during the 2016 season (their 3rd consecutive season). Highlights are typically shown a few days after the live race.

Dorna live broadcasts in the UK to their own app and website. Paid subscription is required. The 2014/15 MotoGP multiscreen video pass was 139.95 Euros or the standard video pass was 99.95 Euros (Nov 2014 – Nov 2015).

BT Sport offers live TV and Digital broadcast of MotoGP in the UK. MotoGP is broadcast on BT Sport 2, BT Sport 2 HD and BT Sport UHD (UK races). To access MotoGP viewers must have an active subscription to a BT Sports pack. For a BTTV customer, access to BT Sport pack is free of charge. For BT Broadband customers (BT Broadband cost is £5 per month) the cost of BT Sports pack is £5 per month (access via Sky TV, App and Website). If customers don't have BT Broadband the cost of BT Sports pack is £19.99 per month (access via Sky TV and App).

BT takes the International Programme Feed from Dorna and adds commentary and digital on-screen graphics (DOGS) to brand the content BT Sport. The IRF provides editorialised race coverage. Dorna also offered access to additional camera angles and live data feeds.

BT hires production companies (for MotoGP this is North One Production) to create additional content which BT Sport uses with the live broadcast from Dorna to create the BT Sport TV show which spans pre-race build-up, race and post-race review.

http://f1broadcasting.co/2014/07/15/motogps-uk-viewing-figures-halve-year-on-year/

Prior to BT Sport gaining rights coverage for MotoGP, the BBC had screened every race live since 2000, with further more extensive coverage on British Eurosport. With an average of 1m viewers every race [7].

In 2014, BT Sport's live race day coverage for the MotoGP portion of proceedings (from 12:30 to approximately 14:00) averaged 155k, peaking at just over 200k the majority of the time. ITV4's highlights programming on Monday evenings averaged 366k, this number including their +1 time-shifted channel. The combined audience of 521k is significantly down on figures in previous years, when MotoGP was live on PSB terrestrial television.

In comparison, BBC Two's MotoGP coverage for the first half of the 2013 season, excluding Austin and Assen, which were not covered live by the channel, averaged exactly 1m, regularly peaking around 1.3m. In addition to that, an additional audience in the region of 150k watched on British Eurosport an hour later, bringing the combined audience is 1.15m. Traditionally, UK's audiences have remained around that level for many years, with slight fluctuations about 100k either way depending on that season's circumstances and other sporting competition in that calendar year [8].

In 2015, a peak TV viewing audience of 433k watched Jorge Lorenzo clinch the 2015 MotoGP championship live on BT Sport (overnight viewing figures). This 2015 peak figure is nearly triple the 2014 peak of 151k when the MotoGP title had already been decided.

As always, these figures only include viewers watching on TV and exclude viewers watching on the BT Sport app. BT Sport App audiences can typically double the audience figures for a particular TV programme.

5.3 Watching MotoGP at Home - Existing Services

Motor Sports sell distribution rights of the footage of their races, usually on a per country basis. Whilst Formual 1 is probably the best known and most valuable MotorSport in Europe MotoGP provides an arguably more entertaining spectacle and has a record of dynamic innovation in the way that it captures and packages coverage of the races.

Our MotoGP Service innovation prototype will deliver content to multiple screens to create a personalised multi-screen experience. Such an experience would be new but it would build on the experiences of broadcasting track motor sport and of apps developed to enhance the fans experience.

Premium Motorsports such as Formula 1, MotoGP and NASCAR offer Apps that provide fans with easy access to a wide variety of content. They usually provide access to live multi-camera races, VoD highlight clips, competition results for drivers/riders and teams, driver/rider profiles and stats, race track maps, technical insights, history, etc. However, all the Apps have been designed to provide a standalone experience and not to be used in a 'multi-screen' context where the TV can be used together with a 'second-screen' device to provide an enhanced 'multi-screen' experience.

Some Apps and handheld devices offer a 'mirror' or 'cast' capability which typically enables some content to be displayed on the TV.

5.3.1 Dorna MotoGP VideoPass App (2016)

Dorna have developed and sell direct to consumers an app to help people follow the MotoGP [9].

5.3.1.1 Multi-camera video mosaic

The MultiScreen VideoPass gives subscribers the option to choose between six different video feeds: The main track feed (as viewed with the Standard VideoPass), a bird's eye view from the Helicopter feed and four different On-Board camera options [9]. The feeds are synchronised and can be viewed simultaneously in a number or preconfigured mosaic layouts.

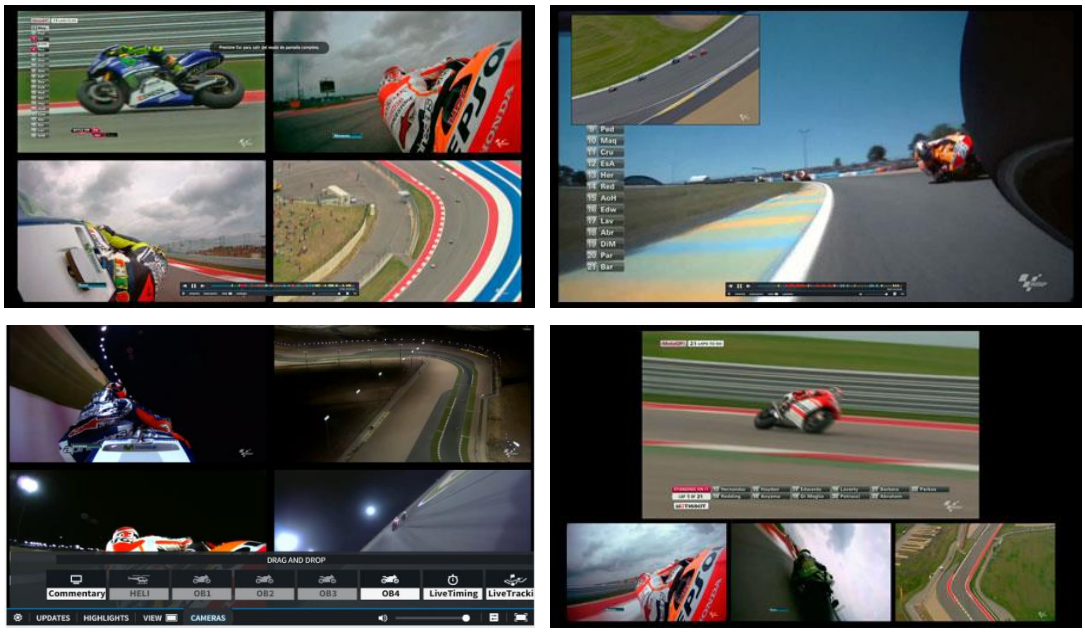


Figure 20. Screenshots from the MotoGP VideoPass App.

5.3.1.2 Text Commentary

Dorna have created a new format of live text commentary which can accompany the viewing of a race or session by providing extra details such as statistical information, race tactics or rider wellbeing after a crash.

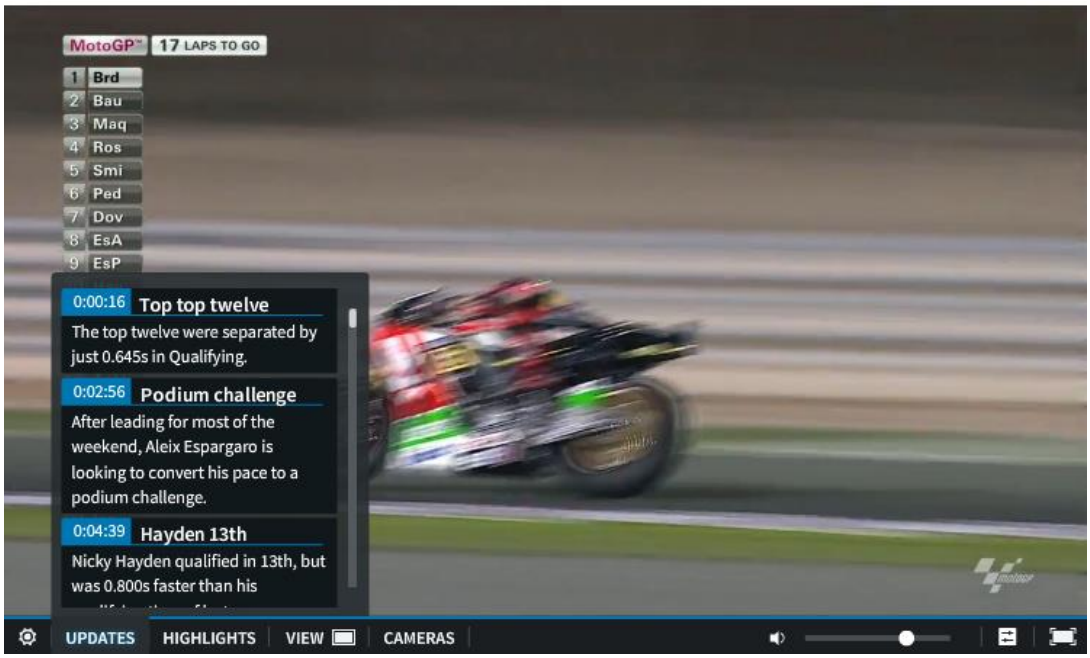


Figure 21. An example of Dorna's live text commentary feature.

5.3.1.3 Direct access to highlights

Every key moment during a session or race is tagged on the timeline so that viewers do not miss out on any important action, whether it be the race start, a run off, a crash, an overtake or a penalty. While viewing the live race, viewers can jump back to any moment to replay and then return to Live viewing, whilst in On-Demand mode all the key moments are provided.

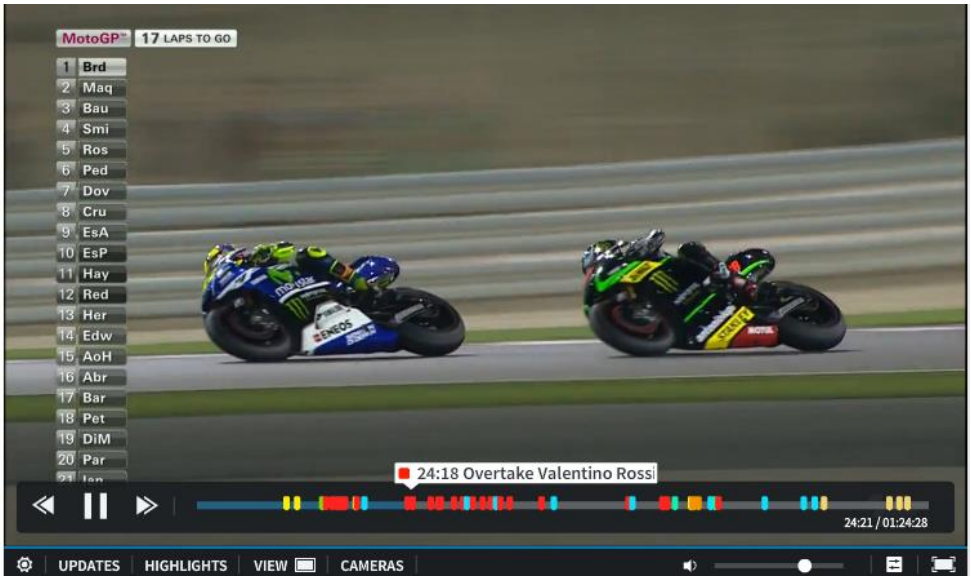


Figure 22. An example of Dorna's highlights access feature.

5.3.1.4 Video resolution control

To provide stable streaming Dorna have provided a manual option to set the viewing quality. An 'Auto' setting is provided which streams at the best possible level given the available Wi-Fi connection strength.

5.3.1.5 Audio Control

The various VideoPass audio setting options allow the viewer to control whether to listen to live commentary, ambient sound or an On-Board factory engine.

5.3.2 BT Sport App

BT Sport introduced multi-screen video feeds into the 2015 update to the BT Sport app. The MotoGP section on the BT Sport app also showcases the latest news, videos, interviews and standings, while our race centre allows viewers to re-live all the best moments, crashes and full races from every Grand Prix event.

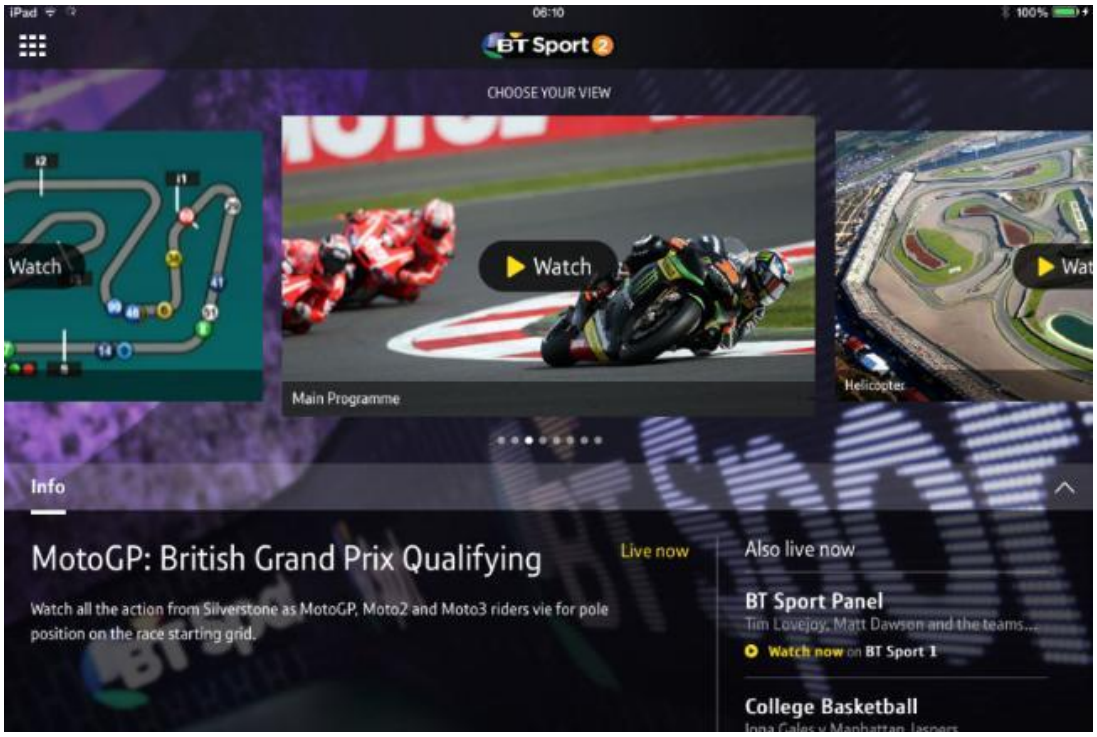


Figure 23. Extra video feeds provided by the BT Sports app.

Race Days

- MotoGP race: Live Timing, Live Tracking, Helicopter Cam, plus four feeds from cameras on bikes
- Moto2 race: Live Timing, Live Tracking, Helicopter Cam, plus four feeds from cameras on bikes.
- Moto3 race: Live Timing, Live Tracking, Helicopter Cam

Qualifying Days

- MotoGP Q2: Live Timing, Live Tracking, Helicopter Cam, plus four feeds from cameras on bikes
- MotoGP Q1: Live Timing, Live Tracking, Helicopter Cam
- MotoGP FP4: Live Timing, Live Tracking, plus four feeds from cameras on bikes

Video feeds are switched once the bikes have taken to the track. When available, the screens appear automatically in the app, but if the feed isn't live yet, you'll see the words "Coming Up".

The App is designed to be used standalone as a video player, not as a companion app to the TV. The app does not provide any method to synchronise video played on the TV and within the App. Differences in how video is delivered to the TV (Multicast) and App (Unicast HLS) results and the App trailing approximately 40 seconds behind video played on the TV [10].

Whilst the Dorna and BT Sport apps are, for obvious reasons, the most relevant apps with respect to the development of this MotoGP use case, inspiration and ideas may also be drawn from the providers such as SkyItalia (for MotoGP again and again based on Dorna feeds), Formula 1 and Nascar. Details of some Apps provided for MotoGP are included below. F1 and Nascar and Indy car racing examples can be found in the Annex.

5.3.3 Sky Italia MotoGP Mosaic (2015)

An interactive TV service is provided by Sky Italia [11], [12].

In a move designed to improve content discovery among its viewers, Sky Italia has introduced mosaic screens for a variety of sports content. The mosaic screen comprises multiple small windows, affording viewers at home the opportunity to rapidly see what is being broadcast on different channels. There are both "normal" and special events mosaics, with various sports tournaments among the beneficiaries of the latter.

If connected to the network, the user can enjoy the full interactivity of the mosaics. For example, with MotoGP it's possible to choose between different bike cameras during the race. Timing data is measured in sectors on the circuit which enables the user to compare several drivers, seeing the gap to the leaders and individual riders, the best recorded time, the maximum speed and so on. Several different mosaics are available, with material including what is essentially a director's view featuring on-board and helicopter camera feeds. This offers the viewer a great opportunity to choose from a wide selection of content for each race event.

Figure 24. MotoGP views offered by the Sky Sports app.

The mosaic facility provided by Sky is created from up to 35 HD video input signals using Dalet four graphics stations, assisted by 12 monitoring stations, two Dalet editing workstations, four Avid 4 AirSpeed video servers, three Avid CountDown stations, four suites with TVs and set-top-boxes and six Kaleido mosaic generators.

Figure 25. Screenshot of 4 views selected from the Sky Sports app menu.

5.4 Watching MotoGP at Home - Prototype Service Description

5.4.1 User Profiles and Service Settings

Both Andy and Matthew have previously created a personal profile which can be accessed by the service provider.

User – During the initial 'online' set-up of BT Sport, viewers have the option to create a personal profile which can be used by service providers (broadcasters, producers and content providers) to personalise the experience. The profile is further developed as the viewer uses the service. The user is able to see and edit details in their user profile. The profile also contains information for social media accounts and other 'paid' services.

Broadcaster - Content service providers can use the profile and service settings data to tailor the user experience to individual viewers and groups of viewers. The user profile contains a broad range of information about the viewer; including demographics, general interest in sports and MotoGP specific preferences, level of expertise, viewing history, etc. Service settings similarly contain information on previously selected service options, preferred layout options and prior saved arrangement settings.

5.4.2 Schedule Reminders and Promotional Messages

Alert on TV and personal device reminding Andy that MotoGP is about to start. Prompt to watch in multi-screen mode for a better experience.

User – The user has previously set-up MotoGP 'race start' alerts. Alternatively, the broadcaster can automatically send alerts based on information provided in the users profile.

Broadcaster – An alert is provided both on the TV and personal device reminding the user that MotoGP is about to start. The reminder also prompts the user to watch in multi-screen mode for a

better experience. An option is provided for the user to always start in multi-screen mode for this TV programme (provided Andy's companion device is available).

User – Sees reminder on his tablet and calls others to join him. Moves into the lounge to watch MotoGP on the big screen.

5.4.3 TV Prompt to watch MotoGP

Andy switches on the TV. The prompt to watch MotoGP is shown. Andy uses the TV remote to action the prompt to change the TV channel to BT Sport 2 HD which is currently showing MotoGP. The race is about to start, with riders just staring the final warm-up lap.

User – The viewer has signed-up for sports alerts, so they don't forget and miss any important news, events or races. This facility will also be used to update the viewer on delays in the start-time

Broadcaster – Use of a push alert service that is capable of sending timely, personalised and contextually relevant alerts to viewers who have indicated an interest in the sport. The push alert service should be capable of being presented across a broad range of devices including smartphones, tablets, STBs and TV displays.

Production – Real-time data feed for both pre-programme alerts and in-programme schedule and events. On occasion races are delayed due to bad weather. At these times the production team would provide details to the broadcaster for onward communication to their viewers.

5.4.4 Responsive Content Presentation

The race leader board is rendered in the top left of the screen, but has been scaled to suit the size and resolution of the large-screen TV so making more screen real-estate available for other content which can be overlaid on top of the video content.

Production – Key programme content has been provided as discrete 'Object-based Media' components. This enables each component to be independently manipulated and displayed by the user or broadcaster aligned to the producers predefined and optimized multi-screen compositions. The content producers must also provide 'green' and 'red' zones for where other media objects can be placed. For example the producer/broadcasters on-screen logos cannot be obscured.

Production - Editorial composition decisions that have been used to create traditionally broadcast programmes will need to be captured so that these can be used to orchestrate the independent object-based media objects (video, audio, leader boards, PiP camera angles, on-screen graphics and idents). An example of this being when and which leader-board graphics are shown on-screen.

Broadcaster – Understands capabilities of the display and the user to display media components in an optimum layout across the available screens.

5.4.5 TV prompt to install BT Sport App (if not already installed)

The TV programme specific HbbTV App running on the TV sees no associated companion applications running on the local network. It therefore displays an on-screen 'prompt' informing the user that the experience can be extended onto a companion device by installing the BT Sport App from either the Apple app store or Android play store. The user searches for the App on their companion device and installs the BT Sport App (HbbTV launcher App capability).

User – User sees the prompt on the TV screen. The user searches for and installs the BT Sports App on their companion screen device.

Broadcaster – Broadcaster provides the companion application in App Stores.

5.4.6 Extension of content across connected screens

The service is aware of associated displays (TV display, Tablet and Smartphone) and asks the user if they want to have an enhanced 'multi-screen experience'.

Broadcaster - The MotoGP TV programme has been authored for a 'multi-screen experience'. The TV service discovers compatible companion screen displays (Tablet and Smartphone). The service understands the capabilities of the device and using user IDs understand who is using the devices.

Broadcaster – An alert is displayed on the companion screen asking if the view wants an 'Extended Experience' on their device. An option is also provided to set this as default choice provided the companion device is available. Confirmation from the user will always be required on the device before the 'Extended Experience' app is fully launched and shown 'full screen'.

User - Andy and Matthew both choose 'Extended Experience' on their respective companion devices.

Broadcaster – Launches applications full-screen on companion screen devices.

Production – Has authored a number of predefined and optimised multi-screen compositions which can be used by the broadcaster to layout content across multiple screens when available. These compositions can be further customised by the Broadcaster to better support regionalisation. For example, British riders may be given higher priority and more prominence for the UK fan audience.

Broadcaster - User profile information previously created is used to customise what media components appear on their respective screens. Device capabilities are understood and are taken into account to deliver a responsive and synchronised viewer experience. Media components (leader board, alternative cam, PiPs, etc.) are independently customisable, changing their presentation format, size, etc. based on screen capabilities and personal user profile settings.

User – The user can use their companion device to select alternative 'pre-defined' layouts or to further customise the layout of individual components across the screens to suit their personal preference. If this is the first time the user has started the BT Sports Companion App, the user will need to type in their BTID credentials (or other secure ID system) to confirm they have a BT Sports subscription and are authorised to access content on the companion App.

5.4.7 Synchronised videos across multiple screens.

Andy's tablet shows a live video feed from Valentino Rossi's on-board bike camera with an overlay showing Rossi's bike telemetry and stats, which matches Andy's interest in Rossi and the level of detail he's interested in as a committed fan.

Broadcaster – Provides video player 'objects' which support live video synchronisation shown across multiple screens. Provides data player 'objects' which support live data presentation. This may also require a notification to the viewer that synchronisation requires the complete experience to watched 'Near Live' (60 seconds delay).

Producer – Provides multiple ABR video feeds which can be streamed and synchronised across a multiple video player 'objects' shown across multiple displays. Provides additional data feeds displayed within data player 'objects' which can be synchronised with other media 'objects' displayed across screens.

5.4.8 Personalised content provision

Matthew's smartphone provides more general information about the riders and for which teams they ride. This level of detail is perfect for his level of knowledge.

User – The user has previously provided the broadcaster with information related to their personal sporting preferences. This profile information is sport specific. For MotoGP the user has selected their favourite riders. The profile also contains information on the knowledgeability of the user with regard

to that sport. Matthew has previously stated that he is a 'Newbie' i.e. has only been following MotoGP for this current season.

Broadcaster – The broadcaster uses information in the viewer's personal profile to customise what content is shown. These facilities are also used by content producers to support personalising the experience. The broadcaster holds the personal profile of the user – the user has a relationship with the broadcaster rather than the content producer. The content producer doesn't have direct access to the viewer's profile.

Production – Content producers will need to add sufficient metadata to the content so that personalisation can be supported by the broadcaster. Certain content (such as rider profiles) may need to be created to suit different level of viewer – Newbie, Part-time, Fanatic. A unified way of classifying viewer types may need to be defined by the industry.

5.4.9 Multi-screen synchronised content

As the commentators follow the action and discuss the race, individual riders are highlighted on his phone, providing a helpful aid memoir to who they are talking about as he watches the race.

Broadcaster – The broadcaster needs to support facilities that can synchronise different media (video streams, data streams, archive video, audio, images, text, etc.) shown on across different displays. As commentators describe the action, perhaps naming individual riders or past races, they need facilities that enables related content to be pushed to viewers in real-time. Media elements can be pre-authored before the race in anticipation of them being used during the live broadcast. The production crew would then use a 'studio tool' to select and publish that related content to viewers. Tools will also be needed that support scheduled delivery/presentation based if events occur (over taking moves, crashes, etc.).

Production – Content must be created with personalisation/customisation in mind. Different levels of rider profile information may need to be created for this use-case which are suitable for the knowledge and expertise of individual viewers (from Newbie to Fan). What useful classification can be applied to sports fans which can be used across all sports? How can this be classification system be communicated to viewers?

User – The viewer may be provided with alternative ways such as a 'Fan Dial' or an 'Engagement Slider' (Fresco 'Immersion Slider') which adapts and changes the level of 'detail' provided to viewers. The slider is labelled - Novice > Spectator > Supporter > Fanatic. Andy's slider is set to Supporter while Matthews is set to Novice, but each has the ability to 'peak' into more or less in-depth detail.

5.4.10 Customisable multi-screen presentation space

Andy wants to see more detailed split timing data and so 'virtually pushes' Rossi's Bikecam to the TV, to make space on his tablet screen. Video from the BikeCam disappears from his tablet and reappears on the TV as a picture-in-picture positioned in the bottom corner of the screen.

User – Ability to move 'media objects' from screen to screen across multiple personal and shared devices. This could be achieved by providing a schematic view which shows on which screens, objects are currently being presented. Also, if the spatial relationship of available displays is understood, then gestures to cast and capture objects from displays could potentially be provided. Viewers should be made aware of 'media object' layout restrictions due to some 'media objects' only being able to be used/presented on certain devices/screens.

Broadcaster and Production – The system will need to support facilities for viewers to change the layout of individual media objects on any screen. Previous discussion have suggested the use of grids and guides could be used with standardised 'media objects' to support flexible yet considered layering and layout of multiple media objects. This may require objects to reorganise and change position dynamically as the user personalises their experience. Some media objects will need to be displayed

on wide range of devices (65" TV to a Smartphones). This will likely require media objects to either be 'responsive' or have multiple instances designed for the device capabilities and context of use.

Media Provider – Independent media providers who offer 'media objects' will need to ensure that those 'media objects' can operate within the multi-screen system.

Broadcaster – An official 'media object' store will be needed which enables authorised third-party 'media objects' to be offered to users. These may be provided for free or be charged for.

5.4.11 Instant seamless push content between screens

As the race unfolds, Marc Marquez is involved in crash. Previously, Andy has configured the system to show action replays on available extended screens. After only a few seconds a replay is made available, which appears as a notification on Andy's tablet and an instant 'pop-up and play' on Matthew's smartphone. It's takes a further 30 seconds or so for a convenient break in action on the main programme feed shown on the TV, before they are able to cut to the replay of Marquez's crash.

User – The viewer can configure how newly available content can be presented on available screens. 'Instant replay' of events, 'angle of lean' telemetry, computer generated visualisations and 'team / rider conversations' are examples of this type of content. The use of this facility enables viewers to see additional information of interest on the most appropriate display.

Production – The producer will use existing tools to create supplementary content which will be made available to viewers. The producer will decide when these will become available and where across available screen they would be placed by default.

Broadcaster – The broadcaster will decide when/if these are presented to the viewer. The broadcaster may want to coordinate these 'pop-ups' into a commentator's interjection. The viewer would likely have the option to change where different temporal 'media objects' are displayed. The broadcaster should ensure that any media object layout/position customisation undertaken by the viewer is remembered and re-used in subsequent sports TV viewing.

5.4.12 Multi-screen 'live' prompts and 'call to actions'

Half-way through the race Andy receives a notification on his tablet to place a spot bet on who will win the race. A synchronised alert also displayed on the TV, so that he doesn't miss the notification on is tablet. Matthew is similarly prompted to answer a viewer poll on which riders will be on the podium.

Media Provider – Creation of a media component which can be launched and closed within the multi-screen framework.

Broadcaster - The position and size of the media component is controlled by the broadcaster with respect to display capabilities and media shown on-screen.

5.4.13 Other possible user stories

The following three placeholder user stories emerged after a project workshop. These ideas need to be considered and may be developed, discarded or adapted in due course:

- Controlling available data and video feeds
  Tracking, Timing, and On-board cameras and telemetry.
- Social chat with other viewers
  Social media and VOIP chat with a small number of friends.

- Bookmark Video
  Facility to bookmark parts of the broadcast for later review and potential sharing on social media networks.

5.5 Watching MotoGP at Home - Location

The service will be used in customer's own premises, according to the most recent figures MotoGP reaches 233 million households worldwide in 207 countries [6].

5.6 Watching MotoGP at Home - Frequency

The service will be provided for both live and on-demand viewing of all MotoGP races. Although, the primary value will always be associated with live viewing of the 18 3-day MotoGP meetings, facilities must also be provided for on-demand viewing as a significant number of events occur very early in the morning (the Australian Moto3 race is broadcast at 03:00 UK time). Specifically, the full suite of facilities would be available for the Qualifying Sessions and Races for Moto3, Moto2 and MotoGP classes.

5.7 Watching MotoGP at Home - Social fit

Motorsports viewing in general typically occurs in consumers own homes. There is no significant 'communal' viewing in pubs and clubs in the UK.

The group most likely to watch motor sport in the UK either as a spectator or on TV are young men, generally from affluent neighbourhoods. Women and the family market are, in general, under-represented [13].

Regular watchers of all types of motor sports are found among three quite different groups. At one end of the spectrum we have the young male enthusiast, reflecting perhaps the aspirations of younger consumers. Somewhere in the middle, are well-off families, who are most likely to be interested in Formula One races. At the other end of the spectrum there is a significant following for a number of different branches of motor sport from those in the pre and no family households and those aged 45-64 with no children aged under 16 years. Whilst the former group may tend to live with well-off parents, or are new home owners, the latter group tend to have the highest amount of disposable income and the least family commitments, thus enabling them the freedom to follow their sport most avidly.

Demographic factors are generally favourable to the future growth of the market. Over the past few years, there has been a growth in the number of 15-24 old males. This group are most likely to be interested in watching motor sport either as a spectator or on TV.

This consumer profile is supported by Mintel consumer surveys (see Annex).

A survey of 2,000 members of the public [14] found that the group most likely to watch motor sport either as a spectator or on TV are young men, generally from affluent neighbourhoods. Significant levels of interest are also shown by other age-groups. Around two-fifths of adults in the 20-24 to 45-54 age groups reported to be followers of the sport.

Of the main racing events, Formula One is the most popular branch of motor sport among the British public. The second most popular motor sport is rallying, followed by motorcycle racing and the touring car races. Formula One is the only branch of the sport which attracts a significant proportion of women. It has a broad appeal by age group, peaking among 45-54 year-olds and 25-34 year-olds but generally higher than average among 15-19 year-olds. By socio-economic group, there is a peak in interest among AB consumers, and also among those from the C2 category.

In terms of social groupings, interest in Formula One peaks among consumers from the no family lifestage group, with significant levels of interest among family and empty nester households located in the most affluent ACORN areas - Thriving and Expanding.

Rallying also has strongest interest among men. It also has a broad appeal in age terms, appearing to peak slightly among those from the youngest 15-19-year-old age group and also the 25-34 age group. The appeal of rallying is consistent among most lifestage groups, only falling off among those from the empty nester category. Other peaks are evident among those living in ACORN Aspiring and Settling neighbourhoods.

Superbike motorcycle racing appeal to younger and middle-aged consumers. Super bike motorcycle racing has a broad appeal by lifestage group, with a slight bias towards consumers from the empty nesters/no family category. Other peaks are evident among those from the Expanding and Aspiring ACORN districts.

Interest in Grand Prix motorcycle (MotoGP) racing differs quite markedly by age, with greater interest among older consumers, peaking among 45-54-year-olds. Interest is also higher among respondents from the empty nesters/no family lifestage group and the Expanding ACORN neighbourhood.

The touring car races generate a higher level of interest among consumers from pre/no-family category. Other peaks are found among those living in the most affluent Thriving and Expanding ACORN areas. It has a strong bias in interest towards men. By age, interest peaks among 15-19 year-olds and the 45-54 age group.

No clear trend emerges for sports car or GT Racing, apart from a bias in interest from those in the Expanding ACORN areas. Sports car racing appears to have a broad appeal among all the demographic groups, as does GT racing. By age, there seems to be a peak in interest in both categories among 45-54-year-olds.

There are no notable peaks in the appeal of rallycross, indicating that it has a broad appeal to most types of consumer. Rallycross has less of a pronounced bias towards men than some of the other forms of motor sport and has an even spread of interest among all age groups.

5.8 Watching MotoGP at Home - Evaluation Plan

The MotoGP World Championship is the premier class of motorcycle road racing. It is currently divided into three classes: MotoGP, Moto2 and Moto3. The primary distinction between these classes is the engine capacity of the motorcycle; 250cc bikes for Moto3, 600cc bikes for Moto2 and 1,000cc bikes for the 'premier' MotoGP races.

The annual MotoGP race season typically starts in late-March and ends in mid-November. It consists of 18 races held in 15 different countries; Qatar, Spain (which hosted three rounds), Portugal, China, France, Italy, Great Britain, the Netherlands, Germany, the US (which hosted two rounds), Czech Republic, San Marino, Japan, Australia and Malaysia.

A typical race meeting will be held over 3 days from a Friday through to a Sunday. On Friday Moto3, Moto2 and MotoGP classes have 2 scheduled free practice sessions each lasting for 30-45mins. Scheduled free practice sessions continue on Saturday in addition to the Moto3, Moto2 and MotoGP 'Qualifying' sessions which determines individual riders starting position on the grid for 'Race Day' on Sunday. On 'Race Day' Moto3, Moto2 and MotoGP riders have a 30min warm-up session prior to starting the 3 main races.

The prototype service will support personalised experiences that can be controlled to suit a viewer's interests/experience with the sport. It will allow video footage and telemetry data to be displayed on a mixture of a large TV and on smaller personal screens.

The MotoGP 'racing track' based prototype service will be based around the Great Britain MotoGP race held in early September 2017 (2nd - 4th September in 2016). The trials with consumers will be held across multiple sites. Research insights will be captured from device/service instrumentation and follow-up qualitative questionnaires and interviews with trialists. We also plan to carry out VIP demos that could be held both at the track and at other VIP locations (BT Centre, BBC, Cisco, etc.).

The Great Britain MotoGP meets have hitherto taken place at the Silverstone race circuit in Northamptonshire. However, the 2017 Great Britain MotoGP is planned to take place at the new Circuit of Wales track, sited approximately 40 miles north of Cardiff.

Production requirements for the 2017 trial will be agreed with Dorna, BT Sport and North One Production during the course of this year. We will further develop relationships with these stakeholders at the Silverstone MotoGP race in early September 2016. This will also enable the project team to further develop our understanding of current production workflows.

The trial will use the available video and data feeds provided through the existing MotoGP rights deal agreed with BT Sport. These rights include access to 9 live video feeds; clips and highlights of qualifying session and races; real time data (timing, track positions and circuit maps and rider standings); and editorial content, such as news stories, picture galleries and social interaction with the riders, teams BT Sport presentation and commentary teams.

Content type	Content description
Video	Live video streams of each MotoGP, Moto2 and Moto3 qualifying session and race, including: • Live BT Sport programming • Feed 1: On Board Camera 1 • Feed 2: On Board Camera 2 • Feed 3: On Board Camera 3 • Feed 4: On Board Camera 4 • Feed 5: Helicopter Feed (race day only) • Feed 6: Live Timing • Feed 7: Live Tracking • Feed 8: Highlights/Clips
On demand replays (geo-blocked to UK)	Provision of full replays of MotoGP, Moto2 and Moto3 qualifying sessions and races.
Clips (geo-blocked to the UK)	Access to clips and highlights of each MotoGP, Moto2 and Moto3 qualifying session and races.
Real-time Data	• Timing • Tracking visualized on circuit maps. • Rider standings.
Editorial	• News stories. • Pictures galleries. • Social interaction with riders, teams, BT Sport presentation and commentary team.

Table 2. Data feeds available for MotoGP service pilot.

The Great Britain MotoGP is the 12th race of the season (March-November). This offers the opportunity to run up to 11 technical tests prior to the live trial using live content feeds from Dorna and BT Sport.

The 2016 MotoGP race calendar is provided below with proposed test/trial schedule aliged to each race which would be undertake in 2017.

Date	Race Location	Venue	Trial / Test
20 Mar	Qatar	Losail	Technical Test
3 Apr	Argentina	Termas de Rio Hondo	Technical Test
10 Apr	America	Circuit of the Americas	Technical Test
24 Apr	Spain	Jerez	Technical Test
8 May	France	Le Mans	Trial

22 May	Italy	Mugello	Technical test
5 Jun	Catalonia	Circuit de Catalunya	Trial
26 Jun	Netherlands	TT Circuit	Technical Test
17 Jul	Germany	Sachsenring	Trial
14 Aug	Austria	Red Bull Ring	Technical Test
21 Aug	Czech Republic	Brno	Trial
4 Sep	Great Britain	Silverstone / Circuit of Wales	Primary Trial
11 Sep	San Marino	Misano	
25 Sep	Aragón	Ciudad del Motor de Aragon	
16 Oct	Japan	Motegi	
23 Oct	Australia	Phillip Island	
30 Oct	Malaysia	Sepang	
13 Nov	Valencia	Valencia	

Table 3. MotoGP 2017 race calendar showing projected testing schedule

Dorna currently provides access to multi-camera angle content from Moto3, Moto2 and MotoGP during the qualifying sessions on Saturday and the main races on Sunday. Additional real-time data feeds (timing, position, bike telemetry) may also be available for inclusion in the test. Editorial content (interviews, circuit previews, replay clips, etc.) will also be available from BT Sport.

It's likely that the Outside Broadcasting (OB) facilities used for MotoGP in 2016 and 2017 will be Timeline's UHD-1 OB truck. As this is 'owned' by BT, the project team should be able to arrange access directly with BT Sport.

Further follow-up and production tool development work activities will likely need to take place during the 'season break' which runs from November 2016 to February 2017.

We are currently considering a number of technical trial options. There are key decisions to be made about the scale of the trial and the technology used to receive and render the content (choices include existing and new Set top Boxes, consumers own devices with Chromecast for TV display.) The decision will be made in conjunction with the technical work packages and the requirements of the other service innovation prototypes.

Current trial options being considered for the MotoGP trial as of Feb 2016 - all subject to change!

Option A

- Live trial running for 2-days across the weekend of the GB MotoGP (Sept 2017). Further trials could be undertaken via 'as live' broadcasts by the project.
- Access to content will be provided via the 'digital' unicast channel to HbbTV STBs (Need to confirm rights and broadcast schedule).
- Approx. 10 – 20 homes
- Trialists use equipment provided by the project - HbbTV2.0 STBs (with CSS support) and companion devices (Android tablets and phones). Some trialists could use their own devices if suitable.

Option B

- Live trial running for 2-days across the weekend of the GB MotoGP (Sept 2017)
- Access to content will be provided via the 'digital' unicast feed to the BT YouView STB rendered within a 'Connected Red Button' HTML5 webpage. Alternatively, the EE STB could speculatively be used if APIs and App could be written. (Need to confirm rights and broadcast schedule).

- Approx. 100-1000 homes of BTTV users (potentially BT employees and families)
- Trialists use their own equipment – YouView STB that supports 'Connected Red Button' facilities and companion-screen devices (Android / iOS tablets and phones).

Option C

- Live trial running for 2-days across the weekend of the GB MotoGP (Sept 2017)
- Access to content will be provided via a 60 second delayed BT Sport X7 multicast feed to the BT YouView STB (need to confirm rights and agreement with BT Sport to broadcast on the X7 channel).
- Approx. 100-1000 BTTV users who subscribe to BT Sport
- Trialists use their own devices

Option D

- Live trial running for 2-days across the weekend of the GB MotoGP (Sept 2017)
- Access to content will be provided on TV via Chromecast device showing the unicast 'digital' stream.
- Approx. 100-1000 BT Sport subscribers
- Trialists use their own devices (companion screen devices and Chromecast)

Option E

- Post live 'broadcast as live' trial run the following weekend (between race weekends).
- Access to content will be re-broadcast by the project team 'as live'. We won't be limited by getting streams live to clients from the event, which may offer us more flexibility to test features, potential cost saving (paid for uplink from location to CDN) and softer DRM and security issues, overcome delivery synchronisation issues (HLS delivery delay).
- Approx. 100-1000 BT Sport subscribers
- Trialists use their own devices (companion screen devices and Chromecast)

6 Prototype Service 4 – Watching Football in a Pub

Watching Football in A Pub

This service innovation prototype might be called 'Sports Bar of the future' but since the experience of watching sport is so dependent upon gaining appropriate content rights and because the experience of watching sport will be nuanced by the sport in question, we have chosen to be specific. Thus this multi-screen experience is called "Watching football in pubs".

This service innovation relates to an experience designed to suit UK city centre pubs showing sport. It will mix large screen viewing with opportunities to view content and interactive experiences that may be playful and promotional, to personal screens. We anticipate a system capable of supporting a diverse range of experiences centred, ultimately, on a single sport event but that finds a way to encourage and promote business within the pub through promotions and possibly competitions.

The project approach is to be strongly user-centred and design-led. Our users are found in the UK and frequent UK pubs in order to watch football. To serve this market effectively we try and concentrate our attention on the social and market aspects that exist in the UK.

The trial will be centred on the Emirates FA Cup Final that will be held in May 2018.

Owner: Martin Trimby (BT) **Rights Originator**: The Football Association

Figure 26. Overview of the Football in a Pub service pilot.

The following Guide Scenario used to help readers picture the proposed Service innovation prototype features **Sue** and **Dave** who are married couple in their 30's. they don't have children and are keen Chelsea fans. They don't live near Chelsea and usually watch matches at their local pub, The Red Lion.

Ron is the landlord at the Red Lion. **Ron**'s early working life was in marketing but he had always fancied running a pub. He negotiated redundancy from his London job and moved out of town to Wiltshore. He gained experience in pubs to provide pin money before taking the chance to run a pub of his own.

6.1 Watching Football in a Pub - Guide scenario

Figure 27. An example of a pub set up for a Football in a Pub scenario

When Arsenal play Chelsea there is only one place Sue and Dave want to be, The Red Lion, their local pub. Ron, the landlord has installed a Multi-Screen TV system and Sue and Dave know they can take their smart Tablets along and connect in to the synchronised broadcast shown on the big screens. [Public displays working with many personal devices].

Their devices give them a personalised view of the match and enables them to easily relive and replay in slow motion key events in the game and well as participate in host of synchronised play along games that prompt them to predict the score, play fantasy football, judge who will cover the most yards and vote for the man of the match [Access to stats data]. Ron encourages people to participate by giving prizes of meal vouchers for the winners of each category. Most people play for the prestige of being the best football pundit on the night [Synchronised multi-player participation].

The big screens around the pub show the main action curated live by the broadcaster's production team. Ron likes to use two of the other screens to show the home and away supporters from two of the stands in the ground. It adds to the atmosphere when either side score a goal, miss a golden chance or hit the woodwork. Ron say's it's more like being in the ground and brings a stadium atmosphere to the pub. [Multi-camera and spatialised audio]

Ron has configured one of the screens to be accessible to patrons, which allows (authorised) clips to be pushed from any Smartphone or tablet that's present in the pub. Dave occasionally uses this to share his favourite clip with others in the bar [Pushing clips to view on the public screen].

Action replays can be collected over course of the match to be viewed over and over on individual tablets to settle debates (though they rarely do). Using the 'SloMo' or 'CloserLook' features you can slow down the action or take a look from a different camera angle (was there contact or was that a dive? Was that really over the line Mr Hurst?). [Multi-camera and trick-play features offered by third-party applets supported by the open framework of platform].

For large events, Ron can also configure the system to join a hosted multi-way link with other pubs and clubs across the county. This enables patrons to join in pub-to-pub events, competitions and quizzes. For today, Ron has joined a moderated Social Media feed which continuously scrolls though selected comments which are synchronised with the broadcast (removing any chance of spoilers) [Space to space and public media sharing].

Red Lion has a long heritage of being an Arsenal supporter's pub. Ron has previously set a profile for the pub which the broadcaster uses to customise some of the chosen camera angle shots and supporting commentary broadcast. Replays which are shown on dedicated 'replay screen' Ron has set-up are also customised to suit the fan-base of the audience. [Customised editorial content].

6.2 Watching Football in a Pub - Market context

Pubs and clubs can choose to show live sport. In the UK the majority year round live sport (e.g. National football leagues, UEFA Champions League, Moto GP, Cricket) is provided by pay to view services and much of the rest (e.g. FA Cup, World Cup, Euro's, Six Nations Rugby, Wimbledon, Olympics) is covered by the BBC's public service provision. If pubs want to be able to show popular sports events with an almost daily frequency year round, they need to buy the rights to show Sport from Pay TV providers such as Sky or BT Sport. The price they pay is determined by the retailer with the tariff being tiered to suit different types and sizes of commercial premises (hotels, pay different amounts to pubs, pay different amounts to sports clubs etc).

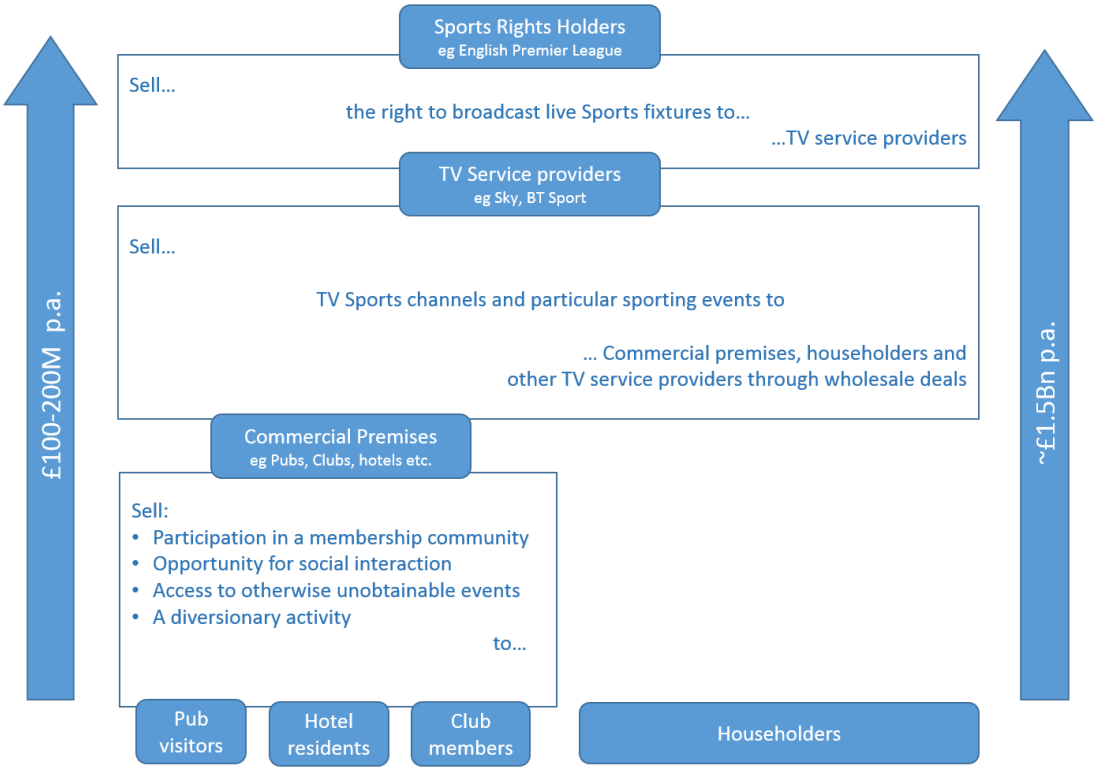


Figure 28. Value chain for distribution of football matches.

The commercial premises assumes it will recover this outlay through greater customer spend, either through greater spend per person (people stay longer and spend more on drinks or food) or through attracting more customers, or both.

Televised sport thus remains an important (optional) ingredient that pubs and clubs can use to try and attract users and increase revenue

- According to this submission to the EU in 2005 (OFCOM and Human Capital Media Strategy Research, 2005 (estimate) an estimated 48,000 commercial premises carried Sky Sports in 2004. Of these about 26,000 are pubs; equating to about 45% of the total number of UK pubs (Snowdon, 2014).
- This news article (BT, 2014) reported that, following BT developing a commercial Sports offering for pubs in competition with Sky, BT had signed up 19,000 outlets. Assuming these outlets are all pubs, this equates to about 42% of the pub estate (estimated to be about 45,000 in 2014).
- According to a YouGov survey (YouGov Reports, 2011) 33% of adults (45% for men 22% for women). report that they have watched sport on television in pubs or clubs (though this is not claimed to be habitual).

We estimate the value of the licenses to watch Sport on TV in UK Pubs is worth about £100 Million revenue per year for the retailers of Sports rights. (Based on 45% of the 45,000 pubs taking some sport and on an average spend per pub, on the licenses to show sport, of £6,000 per year).

Sports rights remain an extremely powerful tool in the Pay TV business. The acquisition of Sports rights is seen as essential component of Sky's successful strategy to build a UK pay TV business and the recent determined pursuance of Sports rights by BT suggests that it still seen as a viable means of gaining ground in the UK Pay TV market.

One of the most attractive and valuable broadcast rights packages is the English Premier League. Rights are usually sold in multi-year packages. Recently (2015) the rights have been split to avoid the development of monopoly rights. The total cost of the most recent rights auction was £5.136Bn for a 3 year deal. This is £1.7Bn per year or £2.2M per game, or £23k per minute of football payed.

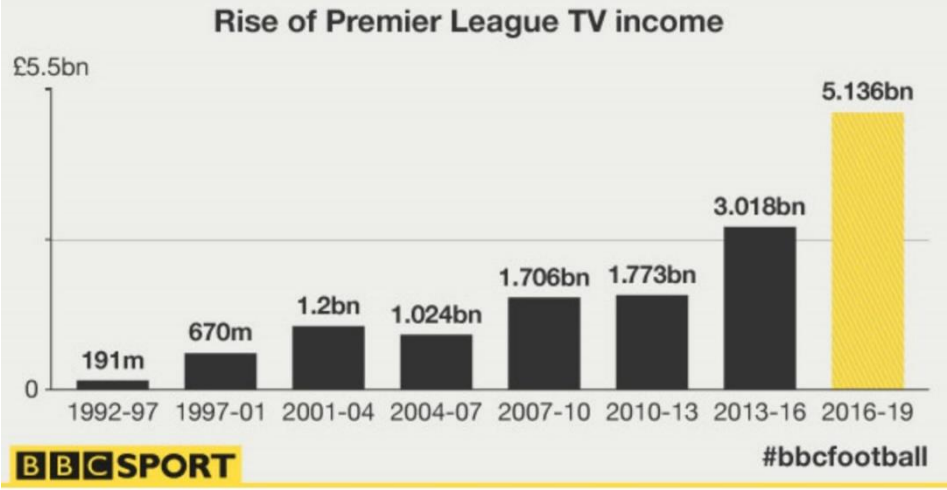


Figure 29. Premier League TV income 1992-2019.

For many people, the Pay TV Sport coverage seen in pubs may well be their first exposure to the Sport coverage of the Pay TV providers. It thus acts as a showcase for the programming; a positive experience of watching the coverage should help encourage the viewer to think more favourably about obtaining access to the Pay TV at home also.

Seeing the coverage 'at its best' in pubs may also help to upsell customers to a new better service, for example from SD to HD or perhaps from HD to UHD.

6.3 Watching Football in a Pub - Existing services

The 2-IMMERSE Watching Football in a pub experience will build on three, possibly four important assets. The social phenomenon of watching football in a pub; the current TV coverage developed by BT and BBC that will be aired in pubs; the sport apps that allow people to follow the game out of the home and possibly AV systems developed for pubs to give them control over multiple screen deployments.

There are three important types of service precursors that provide context for the 'Watching football in a pub' service. The first is the habit of 'watching TV at the pub', the second is the use of smart phones to keep abreast of Sport whilst out of the home and the third is use of audio visual control systems, sold to pubs and clubs, to help them get the most from the connected screen infrastructure they have installed (often solely) for the purpose of watching sport.

6.3.1 Watching football in the pub – the habit

In the UK, watching sport in pubs is now a well-established social phenomenon. Historical analysis of this this social habit suggest the habit emerged following the acquisition by Sky (or BSkyB as it was in 1992) of the TV rights to show live coverage of many Sports events, most particularly matches from the newly formed English Premier League (the Premiership).

In the early 1990s, domestic take-up of Sky's satellite service was relatively low. To increase viewership and revenues, Sky developed a commercial subscription service for pubs and clubs that allowed football fans to watch matches at their local pubs and clubs. Flat screen TV technology and more discreet and affordable projection technologies have become commonplace in the same time period allowing pubs to have, compared to most people's homes, large screens suitable for a crowd of people to view.

Prior to the EPL deal with Sky, there was very little live football on TV. It was feared that airing live football on TV would reduce attendance at matches. The rights deal negotiated by the EPL was for games that started away from the traditional kick off time of 3pm on a Saturday afternoon. This meant that those attending live matches could also watch another live match at the pub either before or after 'their' game. It also increased access to events that were difficult to attend in person.

Figure 30. A scene from a pub during the screening of a football match.

Until 2012 Sky completely dominated the Commercial Pay TV Sports rights market in the UK. However, since BT Sport began competing with Sky for Sports TV rights and, in turn, developed its own commercial BT Sport offering, pubs and clubs now choose either (or both) of the Sky Sports and BT Sports packages.

Since its launch in August 2012 BT Sport has established itself as the most popular live sport channel in UK pubs and clubs market with 19,000 BT Sport Business subscribers alongside its residential subscriber base. Live Premier League, FA Cup, UEFA Champions League and Europa Cup matches are the predominant sports rights which venues screen live to attract and compete for customer footfall and resulting increase in food and drinks revenue.

6.3.2 Sport Apps for mobile devices

In parallel with the emergent habit of watching sport at the pub, smart phones and tablets have created new ways of keeping up with Sport whilst out of the house. These connected devices place statistics on fingertips, settle arguments and fuel opinion. High definition screens now enable mobile tablets, laptops and phone to become first class displays for viewing content as well as information. The broadcast industry refers to them as 'Second Screens' though analytics may reveal that they are rapidly becoming alternative screens.

6.3.2.1 Live Match Pages – Score, Text Commentary and Stats

The BBC Sports App is one of the market leading apps for live text scores and text commentary. Although it does not provide live video streaming of matches, it provides free data driven text commentary and stats along with customisable live score notifications and alerts for all English football leagues (and other sports)

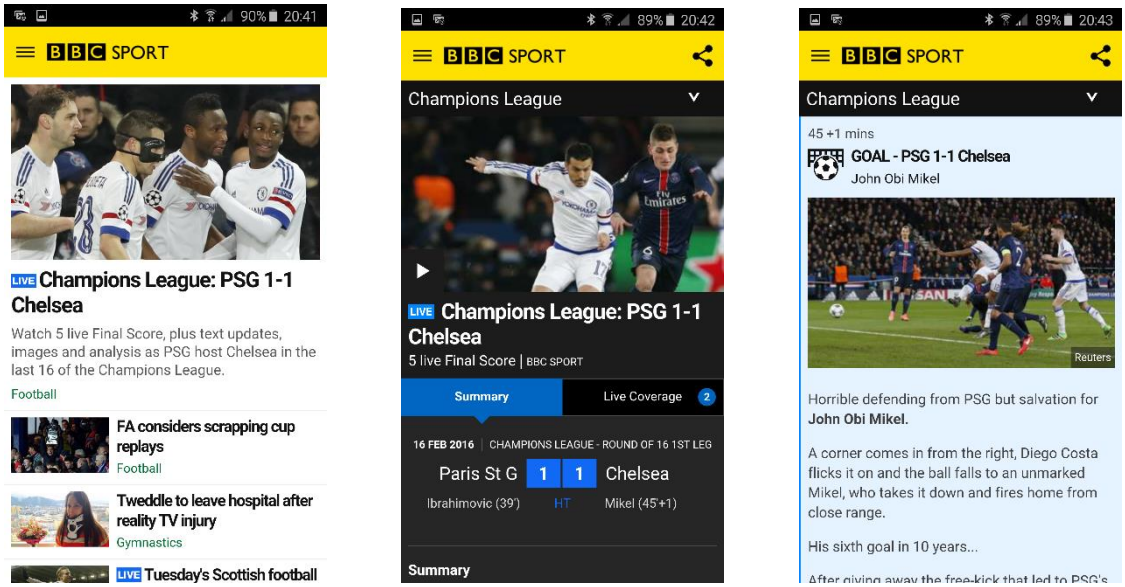


Figure 31. Screenshots from the BBC Sports app during a football match.

Each live match is provisioned with a live match page that combined OPTA driven match commentary with (for key matches) additional BBC production insight and opinion. Basic match summary data (possession, corners etc) are also included, along with links to national or local BBC radio commentary coverage.

6.3.2.2 My Alerts – Custom Push Notifications

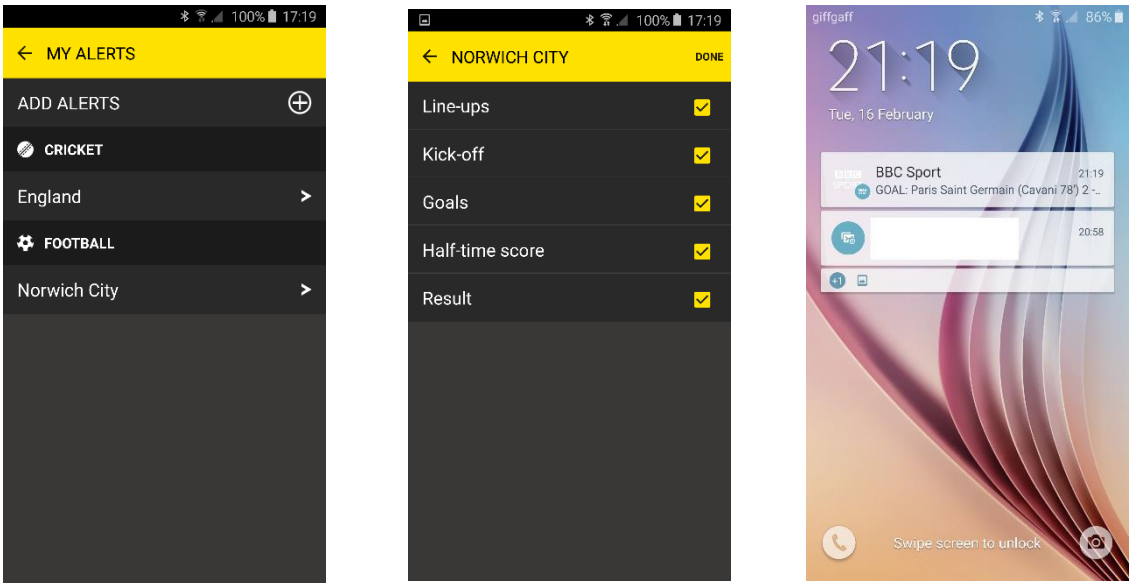
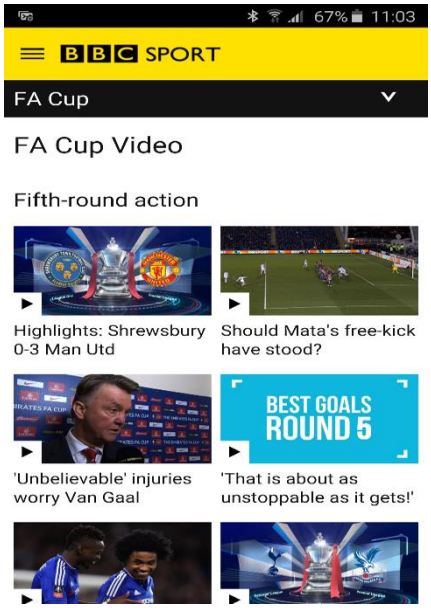


Figure 32. Screenshots from custom alert set up screens from BBC Sports app

BBC also provides an extensive sports notifications service across a wide range of sports. Users can register within the My Alerts section of the App to receive live push notifications to their mobile device. Alerts are customisable on a per sport, per team basis, with football providing notifications of line-ups (pre-match), kick-off and goals scored . Half-time and Full-Time results are confirmed on the completion of each half.

6.3.2.3 Video clips: Goals and key moments (FA Cup only)



For FA Cup matches the BBC can publish video content while the match is in progress, meaning goals and key moments can be made available during the game. This is not the case for Premier League and UEFA matches were digital rights are held by others parties. In the case of the Premier League these digital rights are separated from the TV broadcast rights.

6.3.3 BT Sports App

Both BT Sport (BT Sport App) & BTTV (TV Anywhere) offer residential subscriber Apps that can be used in Pubs (WiFi hotspot or 4G coverage required) Both provide live video streaming of matches with the enhanced video player for UEFA Champions League games providing on demand catch-up of the entire match, with additional data overlays and multi-angle highlights for selected key moments. Customers currently utilise the App as either their primary viewing experience (BT Sport digital customers) or as a companion application to the primary TV experience (BTTV or Sky subscribers)

Figure 33. Screenshots from the BBC Sports app catch-up content.

There are a number of interactive features within the Champions League enhanced player that could currently be utilised as a companion device to the main broadcast, either at home (broadband) or at the pub (4G or WiFi Hotspot).

6.3.3.1 Live Video Streaming

The match broadcast provides a rolling timeline bar populated with key events (goals, key moments, cards and substitutions). This timeline allows the user to navigate backwards in the broadcast to watch the game again from any point.

Figure 34. Screenshot showing live video streaming in the BT Sports app.

6.3.3.2 Match Timeline Events

Browsing the match time line icons provides specific data about that event, such as the exact time, players involved and whether the broadcaster has provided the option of MultiCam.

Figure 35. Screenshot showing match timeline events in the BT Sports app.

6.3.3.3 Multi-Angle Highlights

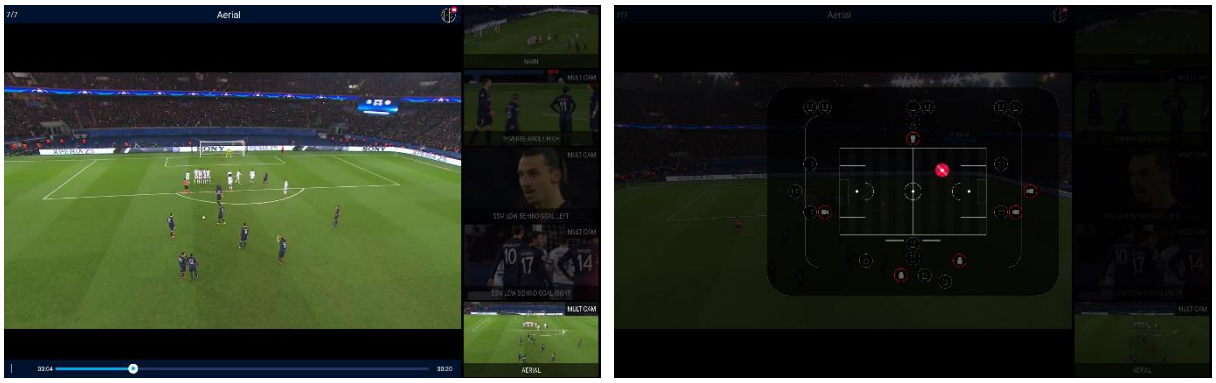


Figure 36. Screenshot showing multi-angle highlights in the BT Sports app.

Where a Multicam asset is made available in the time line, it can be selected to launch a standalone player that is separate from the main broadcast feed. The Viewer can select 8 different angles of the 20 second event. These can be accessed by a right hand menu labelled with camera positions, or from an overlay graphic that shows the location of the camera within the stadium

6.3.3.4 Overlay Match Data

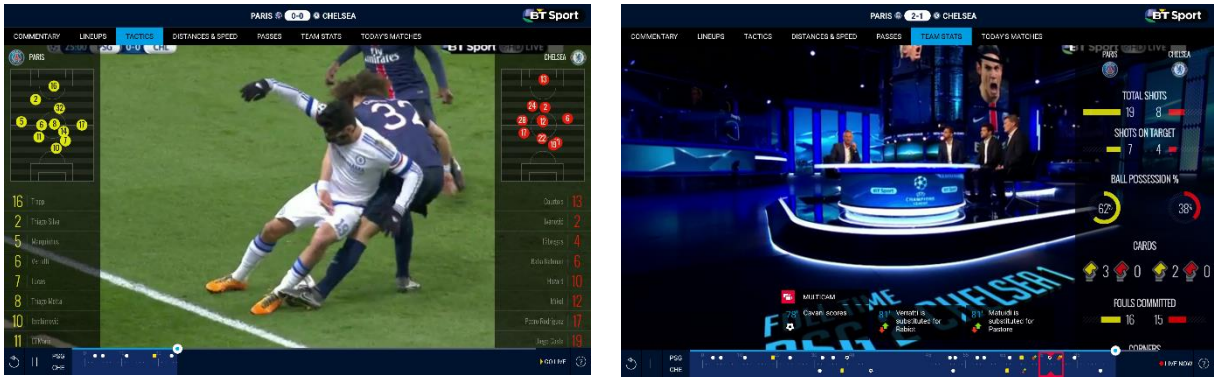


Figure 37. Screenshot showing overlay match data during the game and in the studio in the BT Sports app.

In the primary broadcast player, a top menu provides the ability to overlay data features such as text commentary, line-ups, tactics, distances& speed, passes, team stats. Additionally, concurrent match scores can be displayed, with the option to switch to enhanced player for that match.

6.3.4 Connected AV solution for Pubs - Screach TV

There are pub specific product solutions that attempt to ensure that those venues with multiple screens installed can utilise and leverage those screens beyond live sports events, either for ongoing sports usage, or for alternative uses specific to the venue advertising or promotions.

Screach TV is an installed service were an additional Screach smart box is installed into the venue and connected to the existing broadband, TV's and AV network.

Figure 38. Example of a TV advertising football match coverage in a pub

Screech TV offers 4 subscription packages that provide increasing levels of content, customisation and support for the venue in displaying compelling content. This then establishes customer's attention where licensees can display their own adverts and promotions to help drive footfall sales.

Entry level packages offer advert templates for venue owners to create their own promotional material that this interjected automatically into a single managed channel for the venue. Complete packages offer unlimited templates, up to 25 custom channels and up to 5 zones within the venue. Screach TV also create custom branded adverts for the venue and supply a free tablet to access the Screach portal to update and manage the venue setup.

6.4 Watching Football in a Pub - Prototype service description

The intention is to provide an in-pub experience that mixes large screen viewing with opportunities to view content and interactive experiences that may be playful and promotional, to personal screens. We anticipate a system capable of supporting a diverse range of experiences centred, ultimately, on a single sport event but that finds a way to encourage and promote business within the pub through promotions and possibly competitions. We anticipate that such an experience could only be developed by adopting a much more object oriented approach to broadcasting in which the orchestration and layout of content objects (video, audio, graphics and interactive elements) is negotiated within the viewing premises and not fixed at the broadcast head-end.

The guide scenario will, in due course, be developed and then analysed to identify the requirements that the scenario places upon the 2-IMMERSE system (cf the Theatre At Home Use Case). We recognise that this scenario will require two user roles, the punter and the landlord and that only the latter of these will have direct influence over what is shown on the man screens. We hope to run workshops with pub chain to help develop some of the fledgling ideas in ways that make sense for the pub industry.

6.5 Watching Football in a Pub - Location

At this stage we have not selected a venue that will be used for the trial. We will base our decision on interactions with our stakeholders which will include venue owners and venue-chain owners. We will also take into account venue styles. In section 6.8.1 below we describe our observations from visits to different pubs during a live event.

In the classic US Sports Bar, the whole bar is turned over to become a monument to sport a significant part of which is displaying sports paraphernalia leading some to ruminate on the role of The Sports Bar in curating sport in US culture (Gordon, 2014). UK venues are more flexible in their use and layout.

Figure 39. Images from other sports bars.

6.6 Watching Football in a Pub - Frequency

We would like to conceive a service that could be used whenever a suitably equipped pub is showing sport. With Sports rights being sold globally this can demand that a service concept could become "live" several times a week and at all times of the day. As a point of reference, on the morning after our visit to the Cheltenham pubs, The Spectre pub was showing cricket that was taking place in Australia. The pub was now serving breakfasts, and coffees to a few groups of visitors, some were attempting to work some were, rather alarmingly, ordering alcohol.

In the prototype stage, the service will have a strong focus on a particular high stakes, high profile event - the latter stages of the Emirates FA Cup. Whilst the FA Cup is an annual competition, international football and rugby matches, key European and premiership football matches and the finals of Wimbledon may also attract a similarly enthusiastic crowd – over the course of a year such events may occur about 25 times.

6.7 Watching Football in a Pub - Social context

Watching sport at a pub is a social habit with which we are quite familiar. Nevertheless it is useful to explore what sociologist make of the habit. Ideally all the references here would be to UK studies but they are not. However, as male sports fans who occasionally frequent pubs and clubs broadcasting important games, we are not completely naïve about this culture and find that the academically nuanced observations reported here, the results hundreds of hours of study, chime with our own experiences.

Sociologists have wondered why people watch Sport in Pubs. Weed in the conclusion to his report on watching the 2002 world up in a pub (Weed, 2006), which has a UK focus, ponders the habit thus:

> *Therefore, a key question is: why did people not just watch the matches at home? The answer, perhaps, lies in the sentiments expressed by opinions as diverse as the Lord Chief Justice, John Williams of the Sir Norman Chester Centre for Football Research, former football hooligan and now popular culture writer Dougie Brimson, and Mark Hastings of the British Beer and Pub Association. Each refer in some way to the 'collective enjoyment' or 'shared communal experience' that is part of the pub spectating experience, with the Lord Chief Justice noting that the experience is closer to that of actually attending the match in person than it is to watching at home. It certainly appears to be the case that watching in the pub is qualitatively different to both watching at home and watching live at the stadium, the pub being a sort of 'third place'…*

Buffington also conducted an ethnographic study of people watching the 2006 soccer world cup in a bar in southeastern united states, (Buffington, 2015). Buffington reports that:

> *"Patrons of The Soccer pub engaged in two primary activities; watching the televised broadcast of the game and interacting with each other. The majority of their time was spent intensely focused on a monitor displaying the game. As such, the broadcast played a central role in organizing the management of the physical space and setting the temporal pace. Still patrons found numerous chances to interact with each other. While this included casual conversations among friend and strangers during periods when the game was not being played, significant events on the field (red cards, penalties, goals etc.) often drove interactions both amongst and between tables. This latter point in particular reiterates a central point of the ethnographic analysis: no matter how significant watching the televised broadcast was in this spaces, patrons did not watch in isolation. Interaction with fellow patrons constituted an equally central activity in this setting"*

Others go further in codifying the experience. For example Tyler- Eastman and Land, following their study of Sorts bars in the mid-west (Tyler-Eastman, 1997) identify four schemas by which public sport viewing are contextualized:

- participation in a membership community
- opportunity for social interaction
- access to otherwise unobtainable events
- a diversionary activity.

From an earlier US study, the findings of which do not contradict personal experience, Lemish (Lemish, 1982) reported four rules of public viewing:

1. A public viewer of television adjusts to the setting
2. A public viewer of television adjusts to other viewers
3. A public viewer of television adjusts to the television set
4. A public viewer of television is open for television related social interaction

It seems watching football is a sociable experience, enabling interactions with a wider community of like-minded people that would in other circumstances be awkward. Some may argue that the communities that watch football together are consistent with the view (Maffesoli, 1996) that social existence is conducted through fragmented tribal groupings, that are "…*organised around the catchwords, brand-name and sound-bites of consumer culture <within which> new forms of social collectivity are taking root."*

Bale, (Bale, 1998) in his essay referencing his observations of a Denmark Germany game that was viewed by a large crowd in a public space on "huge tv screens" refers to that fact that the part of the popularity of such an arrangement can be related to *"the place-making potential of fandom*". More prosaically he reports *"A vast crowd attended the game, it was mediated by television but the crowd*

could, for a night, celebrate in the open space. It was a form of carnival with drunken fans celebrating their small nation's victory over the German 'machine'." It sounds like fun. Weed refers to it as the *'place making qualities of sports spectators'*. (Sports fans and travel - Is 'Being There' always important, 2010)

For context Urry defines (Urry, 2002) three needs that may be met by physical travel, and Weed considers whether the experience of travelling to the real sports event can be effectively substituted by travelling to the pub (Sports fans and travel - Is 'Being There' always important, 2010). The three needs that may be met are according to Urry the need: t*o be face-to-face; to face-the-place and to face-the-moment*. Weed argues that watching sport in pubs clearly enables the first of these, it enables viewers to be *face-to-face* with other spectators. They can also gain a sense of *facing-the-place* because of the '*place making qualities of sports spectators*". Fans can also experience *facing-the moment* as they enjoy *"intense moment of co presence by collectively facing a peak moment in which the outcome hangs in the balance and is unknown."* What the trip to the pub cannot give is the bragging rights to 'having been there' – although fans will, for relatively short periods after the event, recount the shared experiences they enjoyed in the pub.

I can still recall where I was when Johnny Wilkinson dropped that winning goal in the 2003 Rugby World Cup Final. I was at an event at Said Business School (I cannot recall whether I was speaking or listening, probably the former but on what topic I cannot recall). That venue is not famed as a venue for watching sport, but at this breakfast meeting (the final was an evening match where it was played in Australia) was gratifyingly astute enough to present the Rugby World cup final on big screens and to delay proceedings to account for extra time.

6.8 Watching Football in a Pub - Evaluation plan

It is early days. The final service prototype will be showcased in 2018 and not all decisions regarding this service prototype have been made at this stage.

We received early support from senior stakeholders in BT Sport (Jamie Hindhaugh, Chief Operating Officer, BT Sport and BT TV) and Andy Beale (Chief Engineer, BT Sport) to associate this prototype service with a major BT Sport event. Given BT Sports current broadcast rights roster for the 2017/18 season **The Emirates FA Cup Final** (May 2018) is the event we would like to use to showcase the prototype service. More details about the Emirates FA Cup can be found in the Annex.

6.8.1 Location exemplars

The landscape of the UK Pub industry is both complex and varied in terms of style of venues and commercial drivers. In developing this concept we have chosen to try and keep a focus on the bigger markets (City Centre Pubs) and to develop ideas based on an assessment of the nature of such venues.

To give a flavour of the way UK pubs present live sport viewing, on Wednesday January 13th 2016 we observed 4 pubs in Cheltenham, looking in particular at the way they used Sports coverage.

On this evening there were 7 midweek English Premier League matches being played, with Liverpool vs Arsenal being broadcast live on BT Sport 1 with kick-off at 7:45pm [15]:

We were joined on the evening by Emma Causer (Commercial Account Director BT Sport) and Mark Daniels (Digital Services Director, Inapub) who provided an industry perspective insight into the venues visited.

We looked at 4 pubs, one, The Moon Under Water, was a JD Wetherspoon pub - JD Wetherspoon is chain of about 900 pubs in the UK that offer very competitively priced beer and standard pub grub again competitively priced. Wetherspoons trade on scale and are usually large venues, this example was no exception. The Moon Under Water was not showing any sport though it had the technical facility to do so. This is important; Sport is an option for pubs and not an essential requirement for success (though on this night, it has to be said, this Wetherspoons looked quite empty and sad…)

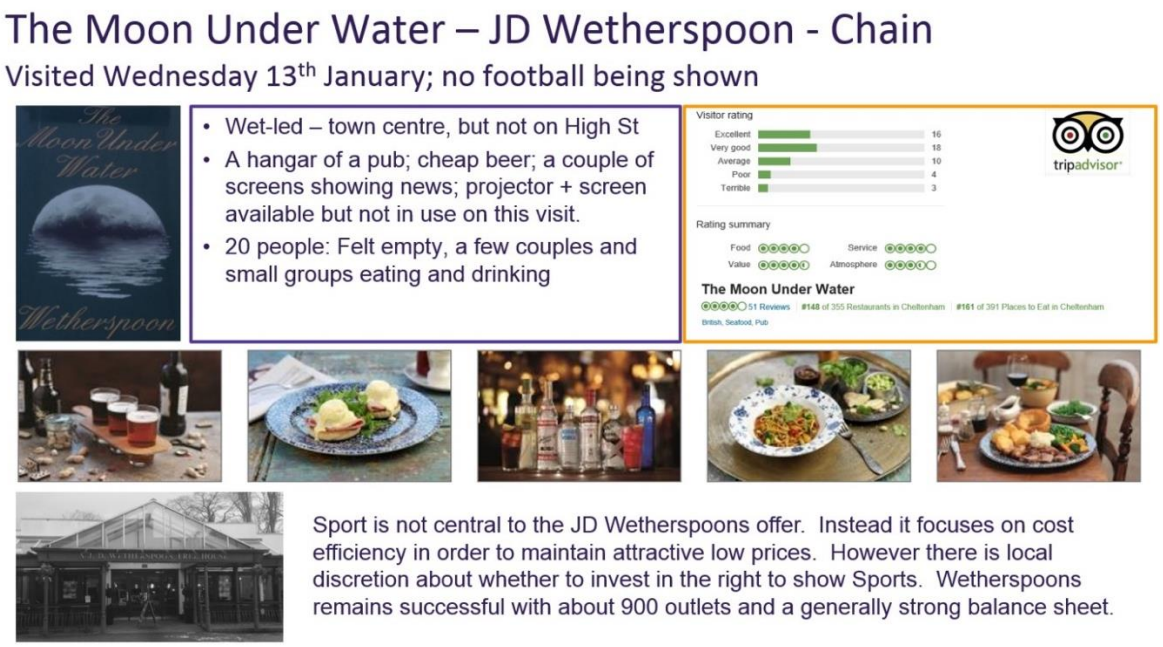


Figure 40. Images from the visit to The Moon Under Water pub.

"Tailors" looked like a pub that had once been a house and the original room layout was more or less still evident. It was carrying sport on many screens and the pub was comfortably full. The screens were little more than domestic in size though there were many of them including several behind the bar. Anwhere you were in the pub you could probably see a screen, hearing the commentary was not so easy – but this was not necessarily a problem. The clientele looked to be on average about 30-40 years old.

Figure 41. Images from the visit to Tailors pub.

The Slug and Lettuce is a chain of branded pubs (about 70 of them) owned and managed by Stonegate Pub company. This bar was not showing sport when we visited– although it had facility to do so and was actively promoting the up-coming 6-nations Rugby international (through posters). The manager said she would put sport on if anyone had asked her to. The Slug and Lettuce (like the Moon Under Water) used roll down projector screens to show the sport. As none was being shown when we visited, these screens rolled away quite discretely. The Slug and Lettuce styled itself as a cocktail bar but, rather incongruously, had a ballroom dancing class going in in one of the rooms with the tables and chairs pushed back to give the dancers space. If nothing else this illustrated how flexible and accommodating some pubs need to be to attract customers.

Figure 42. Images from the visit to Slug and Lettuce pub.

The Spectre (like the Slug and Lettuce) is owned by Stonegate but is not, a branded pub chain. The Spectre was very much a High Street pub situated in a building that, it is easy to imagine, may have been designed as a shop. The bar was the busiest of all those we visited. It had 6-8 large (80-100 inch diagonal) projector screens on the walls all showing the football match as well as normal TVs behind the bar and on the walls. The clientele were younger and livelier than Tailors. They appeared more cheerfully rowdy and playful than the Tailors crowd. Visiting the following morning the bar was still showing Sport (cricket this time) but also serving breakfasts, and coffees as well as slaking the thirsts of more determined clients. The Spectre, like The Slug and Lettuce was flexible. The screens could be put away if there was no Sport to show and tables had wheels on so the layout of the pub could be adapted quickly. The Spectre has some table arrangement that came close to the booth arrangement seen in US Sports bars.

Figure 43. Images from the visit to The Spectre pub.

Our Cheltenham visit was to a tight cluster of city centre venues. Other pub types exist, such as the gastro pub and food led rural pub, but city pubs are the type of venue for which we except to provide innovation. Of the pubs we visited The Spectre appeared to be the type of venue that offered the flexibility and potential for augmented coverage for a future live sports multi-screen scenario.

6.8.2 Trial location options

The assessment of pubs showing Sport provides a good insight into the types of venues in which a deployed service may end up. However the requirements for a trial location are somewhat different and a real live pub is but one option amongst three:

- A public Commercial venue (A real pub)
- A private event venue
- A custom built bar in a BT production facility

Each of these option has pros and cons. The preferred option (though no decision has been made) appears to be the custom built bar option. This may have a greater ability to market the ideas we are developing and this have greater potential for impact.

The following issues have been considered as we seek to choose where the final prototype service will be showcased:

- **Venue Location** – To attract the correct stakeholders and press audience to a central accessible location will be required to allow invitees to attend with the minimal travel impact.
- **Venue Type** – If we choose to run the trial in a real business (a pub or club), there would be a commercial risk for the business, on the other hand operating in a real business would represent a highly ‘situated’ trial location.

- **Venue Cost** – If we utilize an existing private venue (with bar facilities) and install the required technology, there will be potential hire costs for the venue for event(s).
- **Venue Availability & Control** – Will we have enough access and control of the venue in the run-up to iterative tests and the final prototype event? In an ideal world we would have a dedicated venue that is available for installation, testing and multiple events throughout the later stages of delivery (April/May 2018)
- **Venue Connectivity** – Excellent connectivity to the premises is a pre-requisite, but in-venue connectivity should not be underestimated, for wired connection of installed devices (without impacting décor) and potential wireless coverage (WiFi black spots)
- **Venue Audience** – Ultimately, this will be more controllable with a private venue with a specific invite list, for key stakeholders and press. However, the more corporate, technical and press in attendance will potentially dilute the realistic atmosphere of passionate fans who are fully engaged with the match outcome.

The following sections outline our analysis of the pro and cons of each venue type.

6.8.2.1 Option A: Public Commercial Venue

Enable an operating commercial venue to install the prototype service as supplementary to the existing screens in part or all of the premises. This would enable an uncontrolled trial with unknown public customers, covering customer engagement and acquisition with the service to provide realistic feedback on adoption and usage of the prototype service features

Requires: Support and buy in from a commercial venue (small independent or pub chain), to allow us to install and run prototype in a live public environment**.**

Pros:

- Live commercial environment will provide realistic atmosphere.
- Audience fully engaged in the content.
- Opportunities for ethnographic insights into public audience

Cons:

- Challenges of engagement and acquisition of public audience into experience.
- Scope for alterations and installations in venue may be limited.
- Full audience participation may require widespread device/OS support.
- Challenges of integration with premises equipment such as bar tills, lighting etc.

6.8.2.2 Option B: Private Event Venue

Hire an existing function venue which includes bar facilities. Within which we could install the prototype in any configuration and layout restricted only by the layout of the venue. This would enable a private trial for an invited audience. Audience engagement and acquisition would be facilitated to maximize interaction opportunities with all features of the service.

Requires: Suitable venue to be identified in terms of size, layout, facilities and location.

Pros:

- Increased flexibility and control over layout of prototype within venue.
- Private invite only venue allows us to control balance between ‘football fans’ and ‘stakeholders/press’ to retain authentic atmosphere.

- Controlled environment for key stakeholders and press to attend during event.
- Mobile clients could be supplied (were required) to audience in a safe environment – reducing need for universal device/OS support.
- We can ensure increased access (working hours) to venue to for setup and testing.
- Venue can provision bar (and catering) as required in hire agreement.
- Potential to trial integrated features with bar tills Etc. for commercial promotions.

Cons:

- Potentially inhibitive costs of extended hire period or multiple instances for testing and final trial.
- Non-permanent setup would mean increased time and effort for set-up and break-down for each test/event.
- Prototype technology installed may seem 'dropped in' rather than fully integrated into the venue.

6.8.2.3 Option C: Custom Studio Pub/Bar at BT Sport Production Hub.

Build or adapt a custom venue area within the BT Sport Production Hub at Stratford. This could be a private area or part of the public reception area which could be supplemented with bar facilities for live events. Prototype installation could be designed in a custom fabricated layout that could be reusable (if reception area) but BT Sport beyond its usage for this project. This would enable a private trial for an invited audience, maximizing the connectivity with BT Sport team by delivering it on site.

Requires: Support from BT Sport to host scenario demonstrator for April-May 2018 (or extended period) and allocate necessary space, connectivity and general support to the project.

Pros:

- All venue costs could be absorbed within BT Sport budget.
- Total flexibility and control (in partnership with BT Sport) over layout of prototype within venue.
- BT Sport Production Hub is a secure venue which is already used for leading events for key stakeholders and press. This should act as a positive influence in attracting attendees.
- Hosting at BT Sport should provide access to and base of engaged employees to retain authentic atmosphere in venue.
- Mobile clients could be supplied (were required) to audience in a safe environment – reducing need for universal device/OS support.
- We can ensure 24hr unrestricted access to venue to for setup and testing.
- Venue could be used for testing and development on weekends throughout the 2017/18 season.
- Co-locating with production removes all concerns about connectivity and should maximize delivery (and scope) of prototype experience.

Cons:

- Any environment build would have to be extensive or combined with existing plans for reception area refit, requiring close support and collaboration with BT Sport.
- Environment would be ultimately be fabricated with very little authentic elements provided for 'free' as would be the case in existing venues.
- Bar and tills would have to be created and dropped in/enabled for trials.

Since the FA Cup matches played at Wembley are limited to semi-finals and the final, we will have limited testing opportunities in the final year of development. Other FA Cup matches included in the broadcast rights make The FA Community Shield (Saturday 8th August 2016) a viable option for early testing at the start of the season in the preceding August. However, The FA Trophy final is scheduled the day after the FA Cup final (Sunday 22nd May 2016) and cannot therefore be used as testing opportunity before the main event.

We hope to capture content as soon as possible, possible from this year's final in order to facilitate 'as-live' experiences that allow us to conceive, build and test service innovation ideas.

For Live testing each round of the FA Cup would provide testing opportunities during the 2017/18 season. However, venues are subject to the vagaries of each round draw, which may see ties played at lower league venues. To test service prototype features that rely on installed hardware within the venue (eg. Chyron Hego TRACAB optical tracking system) we would be limited to matches played at Premier League venues were the kit is already installed.

For testing and development purposes, any premiership venue hosting a match broadcast live by BT Sport would suffice in 2017/18, where broadcast setup and infrastructure would be comparable to coverage provided for The FA Cup Final. This would open up the opportunity to conduct tests on a more flexible weekly basis in line with BT Sport live picks for English Premier League games.

From the 2016/17 season onwards, BT Sport will be screening 42 matches from 2016/17 season, the majority of which will be broadcast Saturday evenings with a 17:30 BST kick-off. This is directly comparable day and time schedule to the FA Cup event which is widely acknowledged to be the prime time slot for both residential and pub and club viewers.

6.8.3 Trial dates

The dates for the trial are governed by the timetable of the Emirates FA Cup.

The FA Cup is an annual knockout cup competition in English football. It is the oldest association football competition in the world and is organised by, and named after, the Football Association. For sponsorship reasons, from 2015 through to 2018 it is also known as **The Emirates FA Cup.**

In 2014 BT Sport and the BBC acquired *shared* broadcast rights to the Emirates FA Cup from 2014-2018. Up to 25 exclusively live FA Cup matches will be shown on BT Sport from 2014 including the final, which will be shared with the BBC, who have the right to show 16 matches. The deal also includes the FA Community Shield and FA Trophy. Under broadcast rights the BBC has the first and third picks for each round of the competition up to the quarter finals. BT Sport has the second, fourth and fifth picks (where applicable). Where replays are required to settle ties, additional live matches can be selected for TV under the same basis.

The BBC and BT Sport broadcast one semi-final each (BBC first pick), with the final itself being broadcast concurrently on both BBC One and BT Sport 1.

Matches in the FA Cup (from Round1 to Quarter Finals) are played at the home ground of one first team drawn for the tie. In the event of a draw, the replay is played at the ground of the team who originally played away from home, with extra time and penalties deciding the tie if required.

The semi-finals and final are played at Wembley Stadium.

- Semi Finals – Saturday 23 April 2016 & Sunday 24 April (2016 dates)
- Final - Final Saturday 21 May (2016 dates) with kick-off expected to be at 17:15 BST, due to the impressive viewing figures for recent finals with that start time. (Historically the final had kicked off at 15:00 BST.)

7 Summary and Conclusion

Four service prototypes, based on innovations developed in this project have been described.

The first two, 'Theatre at Home' and 'Theatre in Schools' describe compelling experiences using the performances of the Royal Shakespeare Company for audiences at home and in schools. The 'MotoGP at home' service prototype creates a personalised sports related experiences using coverage of the MotoGP developed by Dorna and distributed in the UK by BT. The final use case takes coverage of the Emirates FA Cup (the oldest and best known football knockout cup in the world) for which both BT and the BBC have distribution rights and develops enhanced multi-screen use cases to enhance the enjoyment of football fans watching in pubs and clubs across the UK.

They are described in a way that illustrates the fundamentals of the approach this service innovation project uses. It has a strong focus on the market within which each service innovation may need to operate and a strong sense of the users and their role – hence the use of Guide Scenarios and User Stories to generate the requirements.

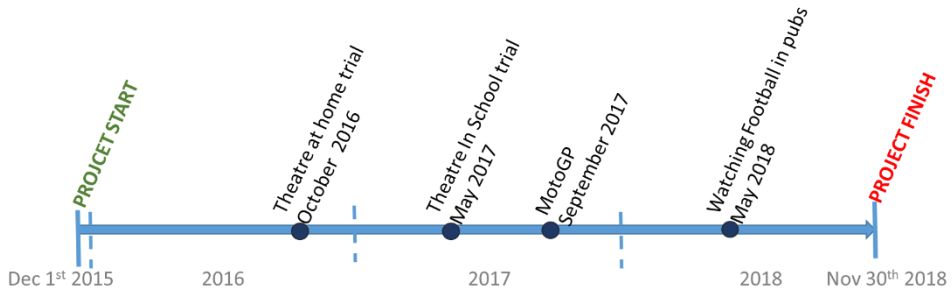


Figure 44. Schedule for the four service prototypes.

The date by which the prototypes should be ready for evaluation has been indicated and outline trial plans for date trial plans for service innovation prototypes.

Whilst the use cases are very specific, it seems clear that many aspects of the service innovation concepts could be used in traditional growth strategies (i.e. same product in adjacent market or similar product in the same market or similar product in an adjacent markets).

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9 Annex 1 – Mintel survey data

The following tables are Mintel Survey providing demographic insight into Motor Sport Viewers

This profile uses ACORN segmentation. Developed by CACI Limited in London, this segmentation tool which categorises the United Kingdom's population into demographic types. It has been built by analysing significant social factors and population behaviour to provide precise information and in-depth understanding of the different types of people and communities across the UK. Acorn segments households, postcodes and neighbourhoods into 6 categories, 18 groups and 62 types.

	All regular watchers of motor sports %	All non-watchers of motor sports %
All	41	59
Men	55	45
Women	27	73
15-19	61	39
20-24	43	57
25-34	45	55
35-44	40	60
45-54	43	57
55-64	37	63
65+	29	71
AB	38	62
C1	42	58
C2	47	53
D	40	60
E	30	70
ACORN categories:		
A - Thriving	42	58
B - Expanding	45	55
C - Rising	42	58
D - Settling	41	59
E - Aspiring	39	61
F - Striving	37	63

Source: Mintel, Motor Sport Leisure Intelligence Report 2003

Table 4. Mintel Survey providing demographic summed across motorsports.

	Formula 1/ Grand Prix racing	Rallying	Superbike motorcycle racing	Touring Cars	Grand Prix motorcycle racing	Sports car racing*	Rally-cross*
	%	%	%	%	%	%	%
All	33	15	12	8	7	5	5
Men	43	22	18	13	10	8	8
Women	23	7	7	3	4	3	2
15-19	45	21	20	15	11	6	6
20-24	30	18	14	9	5	5	7
25-34	34	21	14	9	8	5	5
35-44	33	14	11	6	8	5	4
45-54	36	14	14	11	8	6	6
55-64	31	10	12	6	8	5	5
65+	26	8	6	4	5	4	3
AB	35	13	7	9	6	6	3
C1	34	14	12	6	7	3	4
C2	37	17	15	10	8	5	7
D	30	18	17	10	9	6	6
E	22	9	10	5	6	5	5
Lifestage:							
Pre-/no family	38	22	16	12	8	7	6
Families	31	14	12	7	8	4	4
Empty nester	34	11	12	8	7	5	6
Retired	26	8	6	4	5	4	3
ACORN categories:							
A - Thriving	34	15	14	10	9	6	4
B - Expanding	38	12	12	9	5	5	5
C - Rising	29	14	9	7	8	4	3
D - Settling	33	16	11	8	7	5	5
E - Aspiring	31	16	10	7	6	6	4
F - Striving	29	13	14	6	8	4	7

Source: Mintel, Motor Sport Leisure Intelligence Report 2003

Table 5. Mintel Survey providing demographic of individual motorsports.

10 Annex 2 - Formula 1 – F1 Race Control (2013)

Sky Sports flagship app for F1, Race Control is their 'Event Centre' for F1 racing that can be used as a dedicated viewing app, a second screen companion app or as an On Demand catch-up service.

Figure 45. Screenshots from Sky Sports app for Formula 1

Features:

- Live Broadcast Coverage: Watch as a standalone experience of F1 event.
- Multi-Camera Feeds: Alternative camera angles including x4 on-board cameras (unlabelled), On-board Mix or Pit Lane.
- Additional Feeds: Driver Tracker Map and Timing Screens delivered as single video feeds.
- Highlights Video: Continually updating highlights feed of the race thus far.
- Grand Prix OD Videos: Separate selected highlight videos and analysis from across entire event (practice, qualifying, etc.)
- Combined Twitter Feed: Option curated twitter feed can be viewed alongside live event

11 Annex 3 - NASCAR Raceview Premium (2016)

NASCAR RaceView Premium is a unique online application that enhances the racing experience for motorsport enthusiasts worldwide. RaceView is the first, fully-rendered virtual representation of a major sporting event.

RaceView Premium puts the viewer in complete control for every NASCAR Sprint Cup race. With 3-D rendered virtual video featuring multiple views and camera angles, the viewer can follow live race data and customise which drivers to watch. The viewer can listen to live in-car audio for all 43 Sprint Cup drivers, as well as radio broadcasts for Sprint Cup, Nationwide and Camping World Truck series. It provides real-time stats on positions, speeds, pit stops, and more. Viewers can follow the stats they want to see with customisable leader-boards, telemetry and data modules to see where drivers hit the gas and brakes on the track.

Figure 46. Screenshots from NASCAR Raceview Premium.

Features:

- All features available for every sprint cup series and select xfinity series races
- 3-D virtual rendering of every car and track with multiple viewing angles
- REAL TIME DRIVER STATS including MPH, RPM, throttle/brake, lap times, time off lead, turn by turn performance, fuel estimates and points
- CHOOSE YOUR DRIVER: Select your favorite driver and watch for the entire race
- CUSTOMIZE YOUR EXPERIENCE: Listen and watch different drivers at the same time
- LIVE LEADERBOARDS: Unique Leaderboards for Race and Driver Stats Modes
- LEAD PREDICTION for all drivers on lead lap
- PIT MODE: Virtual video of each driver's pit stops, complete with performance data such as driver/crew times, total time and number of tires
- LIVE IN-CAR AUDIO for all 43 drivers, plus NASCAR Officials channel
- LIVE RADIO broadcast
- SCAN function for all audio channels
- SCANNER ACCESS included with subscription to RaceView Premium
    - LIVE IN-CAR AUDIO for all 43 drivers during each Sprint Cup race
    - EXCLUSIVE OFFICIALS CHANNEL to follow NASCAR Sprint Cup race management communications

- LIVE RADIO Broadcast for Sprint Cup, XFINITY and Camping World Truck Series Races
- SCAN function for all audio channels
- LIVE IN-CAR AUDIO for all drivers in select XFINITY Series Races

12 Annex 4 - NASCAR Raceview Mobile (2016)

Follow the excitement of the 2016 NASCAR season with the Official App of NASCAR, and stay up to date on your favourite drivers with news, video and live race features.

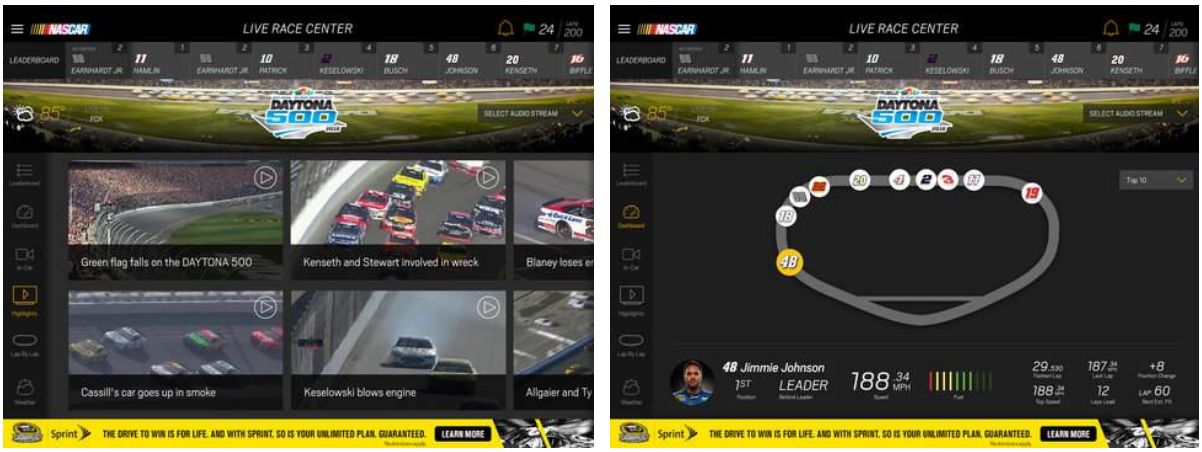

Figure 47. Screenshots from NASCAR Raceview Mobil.

Free Features:

- Live Race Leaderboards for all NASCAR Series
- Live Race Highlights for all NASCAR Sprint Cup Series
- Exclusive News, Video and Social Media
- 2016 Schedule, Standings and Manufacturer Standings
- Customized Notifications including Series Specific Alerts and Live Event Reminders

Premium Live Features:
(Subscription required, but FREE with Sprint unlimited data plan)

- Live Customized Leader boards
- Customized Leader boards with exclusive data points to follow your Favourite Drivers
- Live Driver Audio
- Listen to the In-Race strategy between Drivers, Crew Chiefs and Spotters
- Exclusive to Sprint Cup Series and XFINITY Series races
- Live In-Car Cameras
- Follow the action from the driver seat with Live In-Car cameras
- Exclusive to NASCAR Sprint Cup Series races only
- Live Broadcast Radio & Officials Radio
- Listen to the official NASCAR radio for every race of the season
- NASCAR Officials Radio is available for all Sprint Cup Series races
- Live Real-Time Track Position & Driver Telemetry
- Follow the Track Position for every driver on the track in real time with GPS

13 Annex 5 - Race Drive (2016) – Formerly Race Buddy

New in 2016, NASCAR Drive offers fans a free, centralized race-day destination that combines live-streamed video of in-car cameras along with live driver stats, leaderboard data, Lap x Lap comments and more. Users can customize their live video viewing experience by selecting from the available cameras to fill three viewing modes: single camera, picture-in-picture and mosaic. NASCAR Drive users will also be able to track their Fantasy Live teams' progress throughout the race from the product page. Additionally, Scanner subscribers will be able to listen to in-car audio, the Officials Channel and the radio broadcast from the NASCAR Drive page. NASCAR Drive will be available for all Sprint Cup Series races and for select XFINITY races.

Differences between NASCAR Drive and the former RaceBuddy product.

While there are some similarities between NASCAR Drive and RaceBuddy, there are many new features that have been added to NASCAR Drive that were not previously available with RaceBuddy.

Shared Features:

- Live-streamed video of available in-car cameras and fixed cams (when offered)
- Leaderboard data
- Live chat

New Features:

- Customizable video player
- Lap x Lap comments
- Additional driver stats
- Scanner access on page
- Fantasy Live team management on pages
- Drivers' social media feeds

Figure 48. Screenshots from Race Drive (2016).

More details can be found here:

http://www.nascar.com/racebuddy.html

14 Annex 6- Verizon IndyCar 13 (2013)

Full season coverage of the 2013 Indy Car Championship with Live & On-Demand HD Video and news articles. Mobile App free for Verizon customers that provides alternative camera feeds and choice of broadcast or driver audio feeds as a companion app or standalone race experience.

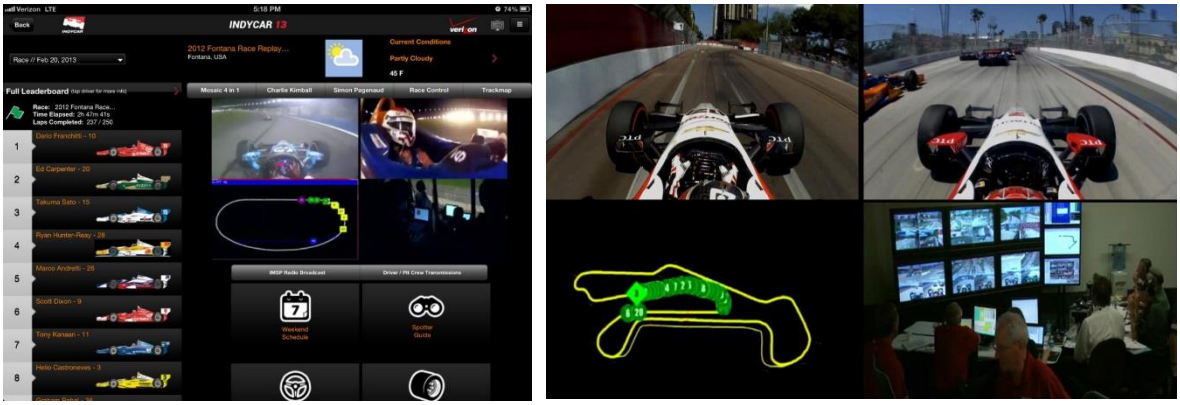

Figure 49. Screenshots from Verizon IndyCar 2013).

Features:

- Additional Video Feeds: Switch between synchronised video feeds of the 2 selected OB cameras, Race Control or Live Timing Track Map.
- Mosaic 4 in 1 View: Watch all alternative cameras in quad view single stream.
- Choice of Audio: Listen to main radio broadcast or driver/pit communications to accompany which ever video feed has been selected.
- Race Control Video/Audio: See & Hear how the race officials review incidents and award penalties during race.
- Named OB Cameras: OB Cameras are identified by driver name and titled in main UI.