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D4.3 Prototype Service Descriptions – First Update

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Abstract

The four multi-screen service innovation prototypes that will be developed by 2-IMMERSE are described in this document. This is the first update to a previous deliverable that brings up to date the visions the project has for each of the four innovation prototypes. The four prototypes 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**

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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 the 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 use the valuable and complementary content forms of live theatre and Sport. The first two to be described, 'Theatre at Home' and 'Theatre in Schools', are experiences based on filmed performances by the Royal Shakespeare Company produced by John Wyver, who works for project partner Illuminations. 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 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 second 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.

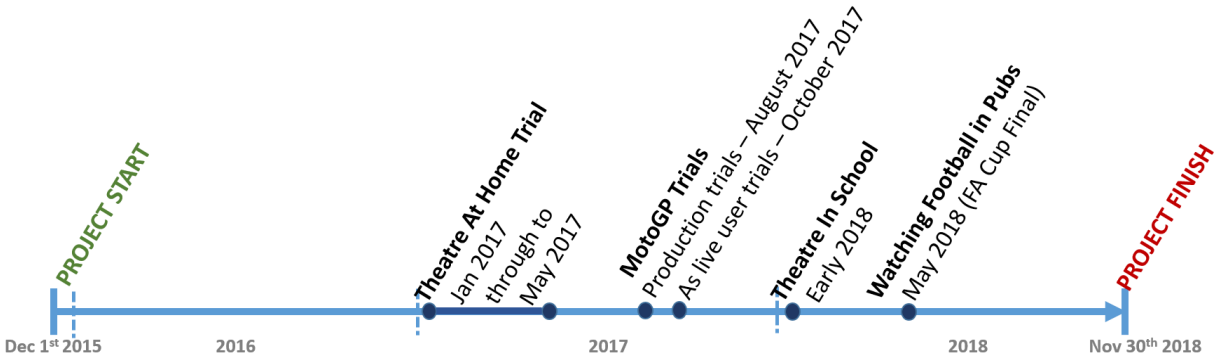

Figure 1 Timeline for the execution of the trials of the service innovation prototypes being developed in 2-IMMERSE

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.

The Annexes provide important contextual information that support the guide scenarios found in the main body of the text. This context includes information about the market and social contexts in which the services will be used as well as 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

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Glossary of terms

Term/acronym	*Definition/explanation*
A Level	A Levels, are secondary school leaving qualification in the United Kingdom. They are offered as a main qualification in England, Wales, and Northern Ireland, as an alternative qualification in Scotland, and as an international school qualification worldwide.
BT Sport	BT Sport is a group of sports television channels provided by BT in the United Kingdom. BT Sport is available on the BT TV, Sky and Virgin Media television platforms in the UK and holds various exclusive rights for Sports including rights to 42 Premier League matches per season as well as exclusive rights to the UEFA Champions League, UEFA Europa League, and MotoGP.
Dorna Sports	Dorna Sports is an international sports management, marketing and media company. The organisation has its headquarters in Madrid, with further branch-offices and/or subsidiaries in Barcelona, Rome and Tokyo. The company has been the exclusive commercial and television rights holder for the FIM Road Racing World Championship Grand Prix (MotoGP™) since 1992.
EDID - Extended Display Identification Data	Extended Display Identification Data (EDID) is a data structure provided by a digital display to describe its capabilities to a video source (e.g. graphics card or set-top box). It is what enables a modern personal computer to know what kinds of monitors are connected to it. EDID is defined by a standard published by the Video Electronics Standards Association (VESA). The EDID includes manufacturer name and serial number, product type, phosphor or filter type, timings supported by the display, display size, luminance data and (for digital displays only) pixel mapping data.
Emirates FA Cup	See FA Cup
EVS	EVS Broadcast Equipment SA is a Belgian company that manufactures live outside broadcast digital video production systems. Its recorders have become the dominant standard for broadcasters worldwide. Their XT3 production video servers enable the creation, editing, exchange and playout of audio and video feeds. The company states that over 5,000 operators of all nationalities now use their applications on a daily basis.
FA Cup	The FA Cup is an annual knockout football competition in men's domestic English football. First played during the 1871–72 season, it is the oldest association football competition in the world.[1] It is organised by and named after The Football Association (The FA). For sponsorship reasons, from 2015 through to 2018 it is also known as The Emirates FA Cup.
Front Row	Front Row is a radio programme broadcast on BBC Radio 4 that has been broadcast since 1998. The BBC describes the programme as a "live magazine programme on the world of arts, literature, film, media and music." It is broadcast each week day between 7.15 pm and 7.45 pm and has a podcast available for download. Shows usually include a mix of interviews, reviews, previews, discussions, reports and columns.
HLS - HTTP live Streaming	HTTP Live Streaming (also known as HLS) is an HTTP-based media streaming communications protocol implemented by Apple Inc. as part of its QuickTime, Safari, OS X, and iOS software. It resembles MPEG-DASH in that it works by breaking the overall stream into a sequence of small HTTP-based file downloads, each download loading one short chunk of an overall potentially unbounded transport stream.
IPF -International Progarmme Feed	The International Programme Feed (IPF) is a video feed provided to international broadcasters in order that they can create their programming. In this context Dorna create an international programme feed that makes up the race elements of the MotoGP coverage created y North One.
IPP - In Programme Promotions	(In Programme Promotions) – Essentially an advert for a forthcoming TV event (often a sports fixture) that is shown during a programme and spoken about by the commentators.

Term/acronym	*Definition/explanation*
IPTV - Internet Protocol television	Internet Protocol television (IPTV) is the delivery of television content using signals based on the logical Internet protocol (IP), rather than through traditional terrestrial, satellite signal, and cable television formats. IPTV is important to this project as it is IPTV delivery that enables the OBB (object based broadcasting) approach to content delivery.
Isolated Camera feeds (ISOs)	Isolated camera feeds are feeds from a single cameras and in our context they related to cameras filming live events. They contrast from the edited programme feed which will include video from many different cameras edited together and overlaid with graphics and additional data. Isolated camera feeds are essential elements in the production of TV but their output is not normally available to users; capturing recordings of theses isolated camera feeds is essential for our experimental work.
MotoGP also Moto 2 an Moto 3	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.
MPEG –DASH - Dynamic Adaptive Streaming over HTTP	MPEG DASH is an adaptive bitrate streaming technique that enables high quality streaming of media content over the Internet delivered from conventional HTTP web servers. The technique is standardized by MPEG the Motion Pictures Expert Group. MPEG DASH is an alternative to HLS
North One	North One is a TV producer. North One produce the non-race elements of BT Sport's MotoGP programming. (studio commentary race build up, pit lane interviews etc.). The race coverage is provided by Dorna Sports.
OBB - Object Based Broadcastig	Object Based Broadcasting involves sending video, graphics, supporting information and audio to a TV device that then renders those objects using the resources (screens and loudspeakers etc.) that are available. The concept applies a web based approach to content delivery and is in stark contrast to traditional broadcasting where all objects are composited at the head end and then broadcast so that everyone receives the same presentation.
OCTO British MotoGP Race	The British Moto GP race is held at a UK race circuit (currently Silverstone) and is sponsored by Octo telematics (the company that make telematics system to monitor driving styles for insurance companies) so is known for sponsorship reasons as the Octo British MotoGP Race.
On Board Bike Cam	MotoGP coverage from Dorna Sport includes footage from on board bike cams; both forward facing and rear facing cameras may be used. They provide additional views that broadcasters and viewers may choose to select.
OPTA	OPTA describe themselves as "The world's leading sports data provider" with a mission to create a global standard for live sports data. They create and sell sports data raging from live in-match data (score, passes completed, distance run etc.) to league tables, player statistics etc. to broadcasters, publishers and to sports clubs themselves as a training aid.
Owl Van	The Owl Van is a small outside broadcast truck that was first used by BT Sport to support a particular camera rig that appeared to have two large eyes, like an owl.
PiP - Picture in picture	Picture-in-picture (PiP) is a feature of some television receivers and similar devices in which one program (channel) is displayed on the full TV screen at the same time as one or more other programs are displayed in inset windows. Sound is usually from the main program only. PiP usually demands the device has the capability to decode two signals simultaneously so is an important use case in our work.
Primary Viewing Area	The primary viewing area is a term used in this project to describe the screen, or array of screens, that a viewer in a public locations like a pub or sports bar, may easily see without having to move their head. We fund it necessary to create the term to help design systems in rooms which may have numerous screens on many or all walls.

Term/acronym	*Definition/explanation*
Ravensbourne College	Ravensbourne college is a UK university offering training and qualifications in Broadcast technology. Ravensbourne College students support The Royal Shakespeare company's live broadcast to schools offering live broadcast and playout facilities.
RSC Royal Shakespeare Company	The Royal Shakespeare company perform Shakespeare's plays, as well as works by Shakespeare's contemporaries and plays by today's writers. The RSc want as many people as possible to be able to access theatre at its best, so we bring our work to the widest possible audience through: Touring and residencies – UK and worldwide; Broadcasts to cinemas Live From Stratford-upon-Avon – UK and worldwide; Online activity; Education work reaching out to 530,000 children and young people, including free Schools' Broadcasts; Making our theatre more accessible
Silverstone	'Silverstone' is a motor racing circuit in England. Silverstone is the current home of both the British Grand Prix and the British round of the MotoGP series.
Spyder cam	Spyder Cam is a camera used in televised sports coverage in to provide a birds-eye view of the game in sports stadia. Spyder Cam is suspended above the pitch via four wires attached to each corner of the ground and controlled by an operator to follow the action from a height of 10 to 40m above the pitch.

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 content distribution.

This document provides the first update to the description of the multi-screen prototype services that 2-IMMERSE will demonstrate and evaluate. It is based on D4.1 "Prototype Service Description – Initial version".

The document should enable the reader to:

- picture the type of services the projects is building/has built
- 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 are described. The first two, 'Theatre at Home' and 'Theatre in Schools' describe 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.

The documented describes some significant differences between the plans outlined in D4.1 and the current plans. For example:

- There has been a change in the order in which the prototype services will be developed
- The Theatre at home trial has been built and evaluated, the evaluation will be reported in deliverable D4.2 "Theatre Trial Evaluation Results" [1], so this document reports work completed rather than work planned. The document will make clear, by referencing the initial plans carefully, how the build compares with the plan and provide reasons for any differences.
- There have been developments in the design plans for MotoGP and Football. These have been based on close discussions with key stakeholders. The nature of these developments will be highlighted in "What's changed" sections under each of the prototype service descriptions.

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. Changes in the original plans have, in large part, been influenced by a deeper understanding of the markets in which the services would operate. The Football use case has focused much more on multiple large screens than on personal screens and has developed designs that reflect screen layouts commonly found in pubs. The MotoGP use case focuses on in-home multiscreen presentation, but has also considered the production requirements of multi-screen content. The production requirements are described in section 5.2.3. The MotoGP use case also details more of the on-boarding process – the mechanism that enables a user to discover and begin to enjoy a multi-screen experience. The Theatre in School prototype service, has been rescheduled to early 2018; in so doing the project has created opportunity to learn more from the Theatre At Home trial and gained time to work with the RSC's education department and with schools to better understand the opportunity offered by the Theatre In School Service Prototype.

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 that must be supported by the 2-IMMERSE platform. The software components created to meet these requirements are then available for all use cases.

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 whose purpose is 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.

Apart from the guide scenario, in the Annexes, 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 in the Annexes.

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 viewer with a personalised experience that can be controlled to suit their interests and level of experience in the sport. It will allow live broadcast video and telemetry data to be displayed on a large screen TV and on smaller personal companion screen devices. The 'User Trials' will take place in a series of 'as live' broadcasts in multiple households and lab environments. Research insights will be captured from device/service instrumentation and qualitative questionnaires and interviews with triallists. A 'Production Trial' will be undertaken on site at Silverstone during the live race where the production tools will be tested. We will showcase the work in demos after the trials at selected industry and academic conferences and events.

The trial will focus on the Octo Great Britain MotoGP race held as Silverstone in late August 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 he 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

This is a first update of the document first published in month 3 of the project. The descriptions are more complete than in the first version, in particular the Theatre At Home Experience has now been realised and tested. There are no plans to develop it further at this stage. The descriptions of the Moto GP experience and the Watching Football in a pub experience have developed considerably following experimentation and socialisation of idea with stakeholders. 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

The key trial dates for each of the service innovations are summarised in the figure below

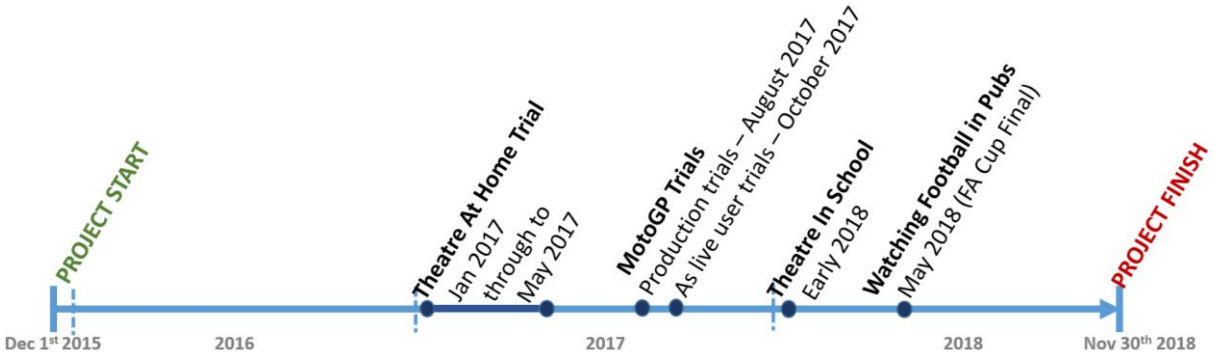


Figure 2 Timeline for the 2-IMMERSE productions tests.

The proposed timeline deviates significantly from that in the original document describing the service innovation prototypes (D4.1). Specifically:

- The Theatre At Home Trial began its evaluation stage in January 2017 (trials were originally planned to start in October 2016) with trials continuing to provide feedback through until May 2017. This late start was agreed once we better understood the time taken to build the 2-IMMERSE platform. The project effectively chose to trade the earlier trial start date for a technical platform that is more extensible and robust.
- The Theatre In School Trial has been rescheduled (from May 2017) to early 2018. Delaying the trial to this time provides opportunity to develop ideas with the Royal Shakespeare Company using the Theatre at Home prototype as a stimulant for the design process.
- The MotoGP trial is split into two trials: a live Production Trial that will take place in August 2017 and a series of as-live User Trials that will take place throughout September and October 2017. The live Production Trial has been scheduled to align with the UK MotoGP race at Silverstone on Aug 27th 2017 in order to test the production tools alongside the live TV production undertaken by Dorna and BT Sport at the event. The User Trials will be undertaken after the Silverstone event as a series of 'as-live' trials in order to reduce the risk of running concurrent trials based on unproven live productions and enable iterative refinement of the platform as the project gathers insights across the user tests. As-live broadcasts are frequently used to cater for a global audience, where the live presentation of races can sometime be at unsociable hours.
- The Watching Football in a Pub trial is still planned for the 2018 FA Cup final, the date of which has yet be announced but is likely to be on the first or second weekend of May 2018

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 indication 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. The synchronicity column provides an estimate of how closely synchronised the video arriving on different screens must be to give a comfortable user experience.

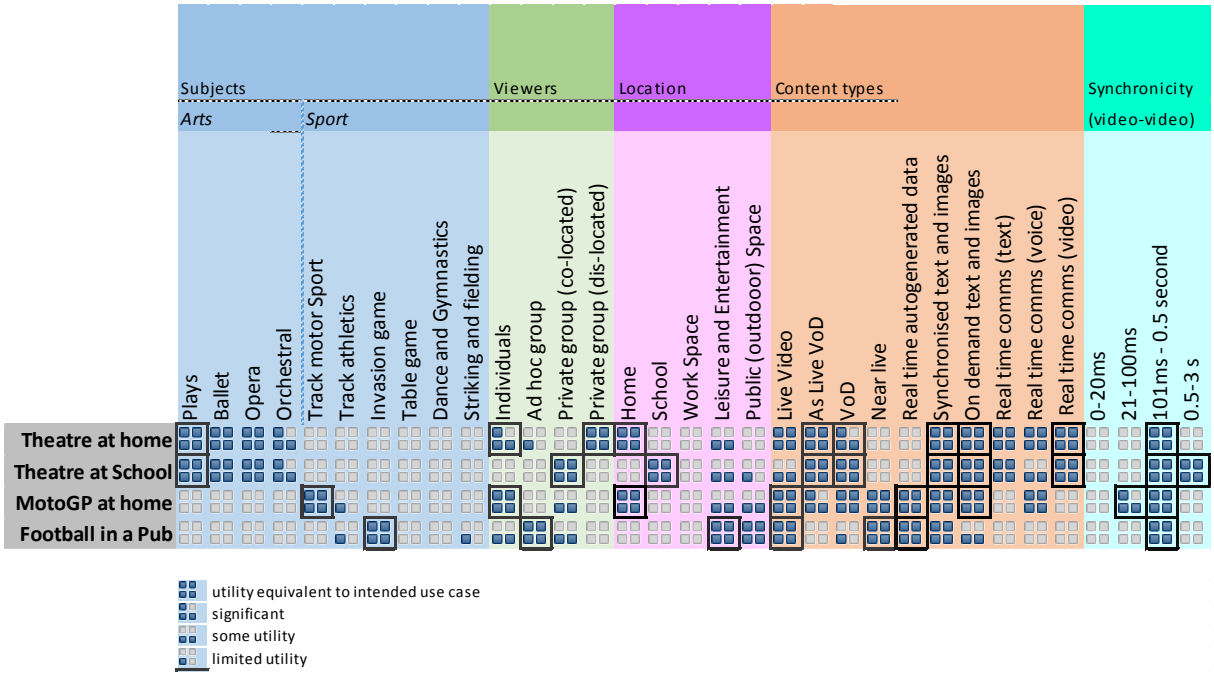


Figure 3 Attributes of the 2-IMMERSE service prototypes with an estimation of the extent to which the innovation developed here may work for other content genres.

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.

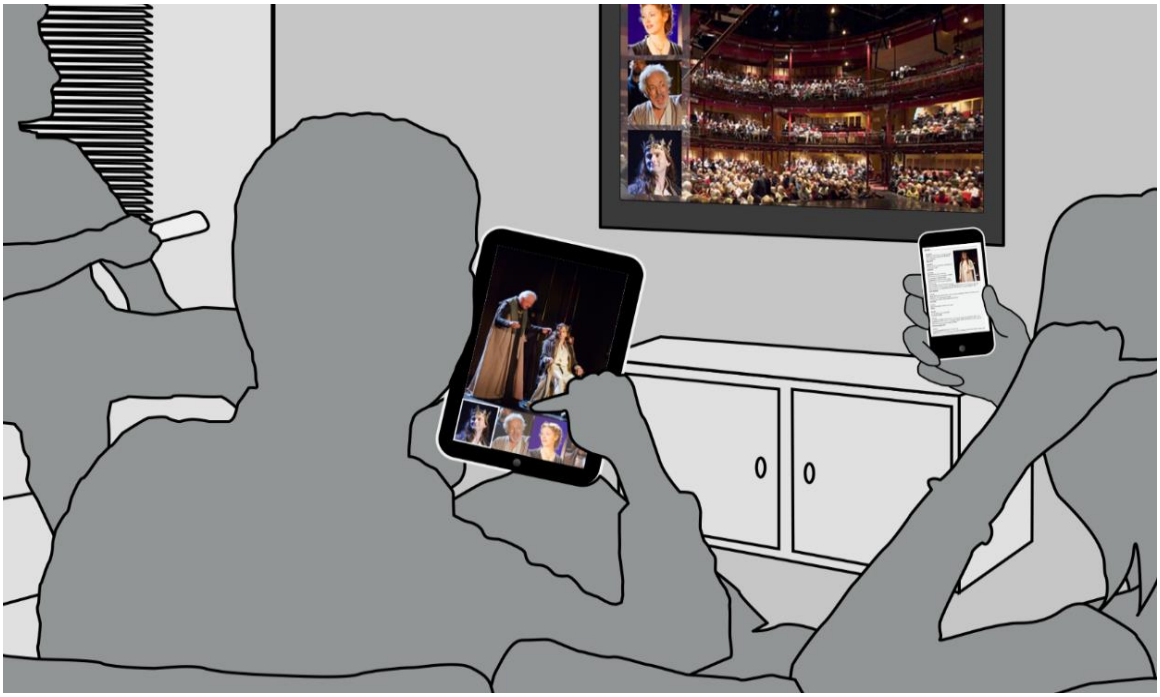
The service innovation prototype will enable a user to watch a theatre production, shot with multiple cameras, as either a live or an 'as live' experience. Viewers will be able to contribute to and monitor different forms of feedback throughout the performance, and to discuss it with others who are watching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

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

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.

N.B. These user stories and notes make reference to a 'box'; this is the metaphor for users sharing an experience (i.e. in the same session) but in different physical locations (contexts), based on the concept of the theatre box.

3.1 Watching Theatre at Home – Guide Scenario



Bob tries to see local plays if they look interesting or if they 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 of it on *Front Row* [1]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,

[1] Front Row is a radio programme broadcast on BBC Radio 4 that has been broadcast since 1998. The BBC describes the programme as a "live magazine programme on the world of arts, literature, film, media and music." It is broadcast each week day between 7.15 pm and 7.45 pm and has a podcast available for download. Shows usually include a mix of interviews, reviews, previews, discussions, reports and columns.

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 dims 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 Blanc.

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 – What's changed?

The Theatre At Home service innovation prototype has now been designed, developed and evaluated. The top level description remains valid and the guide scenario in section 3.1 is broadly representative too. During the development process choices had to be made about which features and functionality could be implemented given the time and resources available.

It is acknowledged, and regretted, that the prototype as developed to date falls short on a number of grounds of the description as originally conceived. That description was ambitious and complex, and the implementation as the overall 2-IMMERSE platform was being built has proved to be more demanding than envisaged. Key elements have, however, been achieved, and the lessons learned throughout this process are already proving to be invaluable for the remaining prototypes within the project.

In D2.1 we outlined the four different kinds of experience that we intended the main and second screens to offer to the user. These were Context, Channels, Crowd and Chatter. The following sections describe the extent to which these elements have been addressed.

3.2.1 Experience class: Context

We wanted to offer the user the ability of contextualising the performance by providing them with access to information about the production in the form of text, images, audio and video. These resources include the kind of material that might be found in a theatre programme, including the list of cast and creatives together with details about what they have appeared in or contributed to previously, as well as short audio and video elements plus 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 the contextual elements are offered as options within the second screen and are not overlaid on the production broadcast, but this may be an option that it is implemented at a later point.

The provision of contextual information about the production has been successfully implemented within the prototype, and this remains accessible to the user before, during and after the performance itself. This information comprises the textual elements of a cast list and the play synopsis, cast and creative biographies and essays about aspects of the production and the play. In addition, during the performance, text synopses of each scene can be accessed to enhance the user's experience. Production and rehearsal images are also available to be accessed, together with short video elements, and in addition contextual video is offered as part of the main stream of the production itself before the performance and during the interval.

Figure 4 Three screen shots of the tablet showing some of the contextual information available from the slider that can be pulled up from the bottom of the tablet screen whilst a video interview with one of the creatives plays in the top left of the screen.

3.2.2 Experience Class: Channels

Our intention was that we would provide the user with different visual perspectives on the performance of live theatre. We envisaged that before and after the show, and also during the interval, live (and potentially interactive) a 360-degree video feed might be streamed from the foyer of the theatre. Then during the broadcast of the theatre show itself it was envisaged that the user, would be able to access, as supplements to the full mix of the performance, and either on the main screen or on the second screen device, three additional synchronised streams; one of these would be the 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.

At present, however, the Watching Theatre at Home prototype offers only a single channel of video from the theatre, which is the full mix of the performance, but this is complemented on the second screen with a synchronised scrolling script which provides the accessibility option envisaged by the optional subtitles.

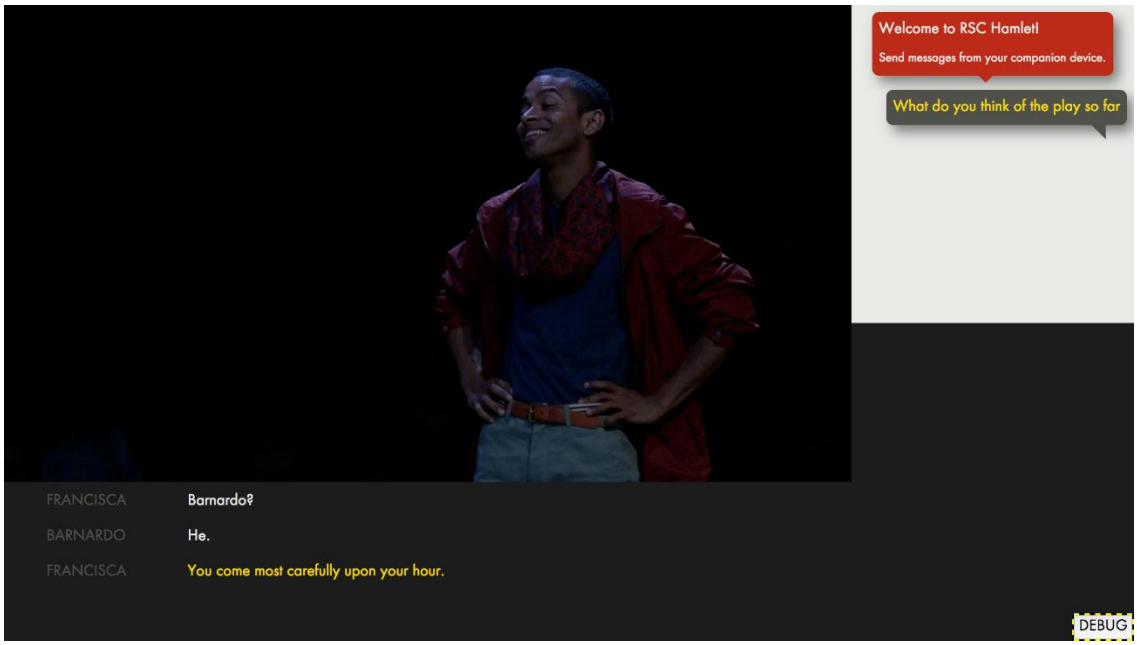


Figure 5 Screen shot of the main TV screen showing the synchronised scrolling script under them main presentation and the text chat window to the right of the screen.

It is proposed that implementation of the alternative video of a fixed-camera wide shot of the stage will be achieved at a later stage of the prototype's development, as this is seen as an important element enhancing the user's experience.

The integration of 360-degree video from the foyer of the theatre is now regarded as perhaps less essential as a component. During discussions of its possibilities it has also been pointed out that it raises certain privacy and permission issues for those attending the theatre that are not problematic if the performance alone is being broadcast from the auditorium.

3.2.3 Experience class: Crowd

We wanted to enable the viewer to gain something of the sense of being amongst a crowd as they experienced the performance. We aimed to do this by allowing the user to access, on the second screen, a graphical representation 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. We envisaged that the user could 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. This feedback would be aggregated and expressed automatically in numerical and graphical form and also as supplementary audio of applause.

The graphical, and potentially aural, presentation of the crowd in the forms envisaged have not to date been implemented. In part this is because their achievement is a technical task of considerable complexity, and it was decided within the project during this first phase to focus on the basic elements of the channels, context and, as below, chatter. As the planning of the evaluation trials developed it also became clear that these would be undertaken initially between just pairs of households and that within this scheme the testing of the proposed crowd elements would not be feasible. Enhancing the home experience by offering virtual forms of the social experience, in addition to the video chat, remains a priority for the project, but we now have a more realistic sense of just how hard this is to implement.

3.2.4 Experience Class: Chatter

Central to the vision of the Watching Theatre at Home prototype was offering the user the ability to chat about the performance by facilitating, through the combination of the main and second screens, real-time interaction with others, primarily before the show begins, during the interval and afterwards. This main interaction has been successfully implemented via video chat. In future implementations the user will be able to organise in advance who will be part of the group for video chat – 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.

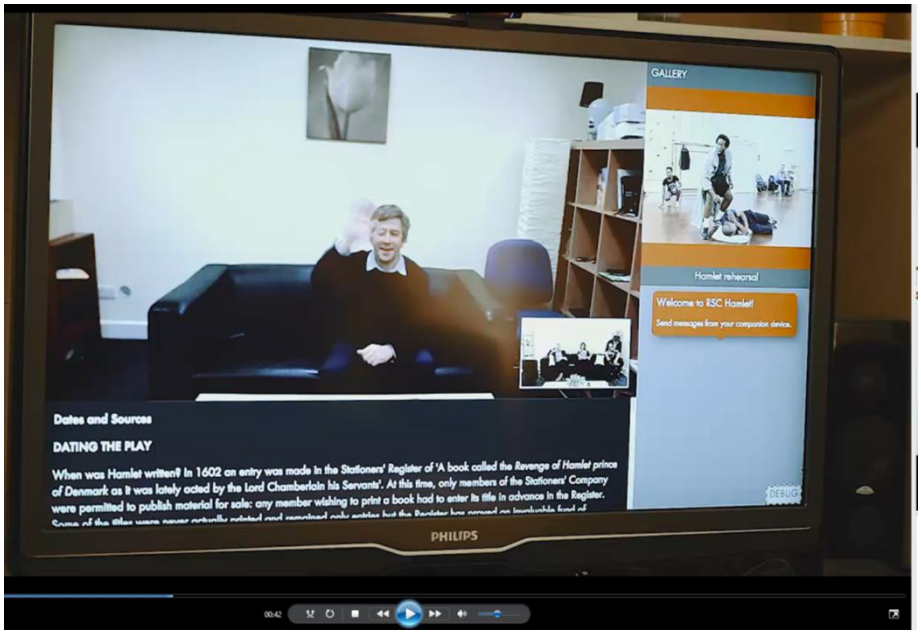


Figure 6 Screen grab from the main screen with video hat showing on the main screen alongside the text chat window.

As already noted, real-time interaction via both video chat and text chat has been successfully implemented within the Watching Theatre at Home prototype. The user is able to use video chat before the performance, during the interval and after the performance is over, but not – in accordance with the social ritual of sitting in a theatre – during the performance itself. The video chat box is active on the second screen. Text chat amongst those in the virtual "box" remains active throughout the experience, including during the performance, and is visible on both the main and second screens. It is hoped that by creating a social context for the user both video and text chat significantly extend the experience of watching a performance on domestic screens.

3.3 Watching Theatre at Home – Reflections from the evaluation

The prototype Watching Theatre at home service, was built using a micro service based software platform. It became available in early January 2017 and was evaluated over the following months. The evaluation served to:

1. Evaluate the technology platform used to support the experience
2. Evaluate this specific experience
3. Provide more generic insights that should be valuable for subsequent prototypes being developed in 2-IMMERSE.

The technical performance of the platform was assessed, through a reflective process involving key stakeholders within the project such as: Platform developers; Application developers; and Cloud deployment specialists. We asked the stakeholders to reflect upon key aspects of the platform such as: extensibility, robustness, scalability, ease of deployment, ease of use and the feature set available.

The Theatre At Home experience itself was carried out through twelve trials, involving two households per trial with one to three people present at each household. Evaluations were based on questionnaires, qualitative semi-structured interviews with triallists and on analytics of application use based on instrumentation of the app we built.

In terms of the technical performance of the platform, we conclude that the micro-service approach that we adopted was very well suited to the deployment of distributed media applications across multiple screens and multiple locations. In terms of extensibility we believe that the micro service based architecture that we have chosen makes the platform naturally extensible. However, more work is required to give developers the confidence to extend the platform. To improve extensibility further we will consider creating client-side application architecture diagrams and further tutorials, documentation, and overviews to help developers understand and engage with the development of Distributed Media Applications (DMApps).

A large number of actions that can be taken to further improve scalability, robustness, of the platform were identified. Many of these are related to the particular challenges associated with building distributed applications.

The results from the user evaluation of the theatre At Home may well be generalizable beyond the particular Theatre At Home experience. The findings included the following:

1. Users appreciated the fact that the Theatre At Home experience echoed some of the ritualistic aspects of going to the theatre.
2. Users endorsed the producer's view that the play should be shown on the shared TV screen and not cluttered by additional content
3. Users were positive about the ability to share the experience through text and video chat
4. Users indicated that choice is important indicating they would like more control over the selection and placement of different features.
5. User responses confirmed a number of insights for multi-screen layout preferences

a. the companion was the place for referencing and controlling;

b. the shared TV was for shared features of primary interest –mainly the play (video-window), notifications, and socializing during the intervals;

c. the presence of other features such as the script and social media was negotiated.

The findings will aid the orchestration of future multi-screen experiences.

The ability to manipulate features of the experience means the experience creators have to make decisions about the framework holding the experience together and how individual objects, that form the building blocks of the experience, behave (i.e., the rules and the models). For example, decisions have to be made about who should decide what goes where? These decisions are layered:

1. Decisions about the design of the overall experience concept –defining the format, phasing, and essential elements of the experience.
2. Decisions about which features of the experience are predefined and automated (so users have no control over when and where they appear); and features which are adaptable and can be manipulated by users.
3. Decisions on the degree of adaptability of features, and guidelines/rules on how users can manipulate them. E.g., ability to switch features on/off, ability to change the position of features (device/screen, layout), adaptable to change the appearance of features (palette, font, responsive sizing, etc.), responsive personalization of features (novice/expert).

For details of the evaluation method and the detailed findings please refer to D4.2 [1].

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

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

Samra is looking forward to school this morning. Her A' level [2]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.

[2] A Levels, are secondary school leaving qualification in the United Kingdom. They are offered as a main qualification in England, Wales, and Northern Ireland, as an alternative qualification in Scotland, and as an international school qualification worldwide.

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.

4.1 Watching Theatre in School – What's changed?

Although it was envisaged that the Watching Theatre in School prototype would precede Watching Theatre at Home, the complexities of implementing the latter and the learnings that have come from this process vindicate the decision to reverse the two. Watching Theatre at School is still intended to be developed with RSC Education, and having a working prototype of the domestic version is invaluable for introducing key ideas of second stream media production and use to potential collaborators within the RSC.

The central vision for the Watching Theatre at School prototype is retained, but we are certain that this will be refined and developed in the coming months as workshop activities with RSC Education feed into the thinking and planning of the project

4.2 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 the Royal Shakespeare Company use for their schools broadcast. Currently the platform the Royal Shakespeare Company uses is provided by Ravensbourne[3] college. The live platform, run from a TV gallery system, mixes the streamed content of the recorded performance with live interviews filmed at Ravensbourne. The same platform also manages the text based questions coming in from the schools as well as having various service status functions in place to identify and help schools having trouble with the playout.

4.3 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 early 2018. The school will be chosen in conjunction with the Royal Shakespeare Company and will be one where previous 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 spring of 2018.

[3] Ravensbourne college is a UK university offering training and qualifications in Broadcast technology. Ravensbourne College students support The Royal Shakespeare company's live broadcast to schools offering live broadcast and playout facilities.

5 Prototype Service 3 – MotoGP at home

Watching MotoGP at Home

This service innovation will provide a viewer with a personalised experience that can be controlled to suit their interests and level of experience in the sport. It will allow live broadcast video and telemetry data to be displayed on a large screen TV and on smaller personal companion screen devices. The 'User Trials' will take place in a series of 'as live' broadcasts in multiple households and lab environments. Research insights will be captured from device/service instrumentation and qualitative questionnaires and interviews with triallists. A 'Production Trial' will be undertaken on site at Silverstone during the live race where the production tools will be tested. We will showcase the work in demos after the trials at selected industry and academic conferences and events.

The trial will focus on the Octo Great Britain MotoGP race held as Silverstone in late August 2017.

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

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 a *VideoPass* subscription access to their content allowing people to view races directly via an App and website.

Dorna Sports provide services with significant global reach [2], [3]. And in 2010 MotoGP became the second largest motorsport in the world [4] 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.

More details of the market context are included in the Annex (section 11.1).

5.1 Watching MotoGP at Home – Guide scenario

The following scenario has been written to articulate the key facilities provided within the MotoGP at Home prototype. The service users are father and son Andy and Matthew, who are of different ages, use different compaion screen devices and have a different level of knowledge and interest in MotoGP.

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.

Andy is watching MotoGP at home with his son 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 platform that controls the presentation of content on available displays is aware of the shared TV and that Mathew and Andy have their smartphone and tablet with them.

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 provides more general information about the riders and the teams for which 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 – What's changed?

Since the publication of D4.1 in February 2016, a number of high-level changes have been made regarding the work and trials to be undertaken with respect to the MotoGP at Home Trial. These are outlined below.

5.2.1 Definition of Production Trial and User Trial

In discussion with BT Sport and Dorna we have decided to run the MotoGP at Home trial as two trials.

The first will be a Production Trial at Silverstone on Aug 27th 2017 which will focus on testing our live production tools. The second trial will be run as a series of 'as-live' User Trials that will take place throughout September and October 2017. This approach will reduce risks associated with running concurrent trials based on unproven live production tools and enable iterative refinement of the platform as the project gathers insights across the series of user tests.

The project (via BT Sport) has an agreement with Dorna for the provision and use of assets within the trials and for socialisation of the work at academic and industry events and conferences, etc.

5.2.2 Visual Demonstrator development

A visual demonstrator has been developed which enabled the team to explore a number of key capabilities early in the UX and technical development process. It also enabled the team to further engage with Dorna to gain input and steer from a key commercial stakeholder. The visual demonstrator has explored the following facilities.

- Real-time rendered, JavaScript-driven on-screen graphics, created using Adobe Animate to replicate Dorna's existing graphics.
- Data input to, and control of, on-screen graphics.
- 360 video rendered as a Picture in Picture with viewpoint controlled from a Wi-Fi connected companion screen devices.
- Remote 'production' control of on-screen graphics.
- Multiple concurrent and synchronised video overlays.
- Responsive presentation with independently scaled and positioned graphics for 3 layouts.

5.2.3 Production tools

The MotoGP trial has given more focus to developing the requirements for production tools. This was required to support the development of both the pre-production and live production tools that will be used to drive the 'As Live' user trial.

5.2.4 Trialling the on-boarding process

The MotoGP at Home prototype will trial the complete end-to-end on-boarding process needed for the delivery of future multi-screen services. This will include how a viewer discovers a multi-screen service offering, associates multiple devices, downloads applications, and completes a viewer profile and starts and multiscreen experience.

The generation or use of a User Profile is part of this process will also enable the project to test the use of customised presentations aligned to the level of experience and interest in sports.

5.2.5 360 degree video support

At the end of the 2016 MotoGP season in Mav 2016, Dorna publically showcased the use of 360 degree video from on-board a motorcycle. In 2017 Dorna have continued to provide a number of 360 degree video clips from one motorcycle within the MotoGP races. This provides the project with an opportunity to explore how live 360 degree video could be included in future live broadcast multi-screen sports experiences.

5.3 Watching MotoGP at Home – Prototype Service Description

This section outlines the key facilities provided within the MotoGP prototype service.

5.3.1 Key Capabilities Overview

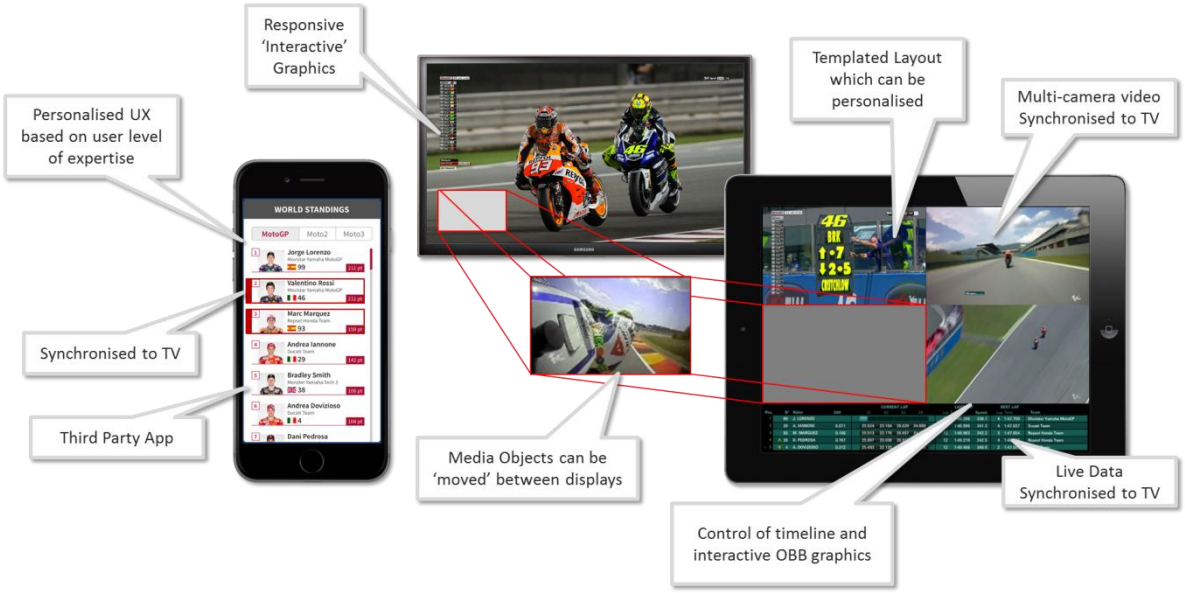


Figure 7 Overview of key MotoGP capabilities

5.3.2 TV Information Graphics Schematic

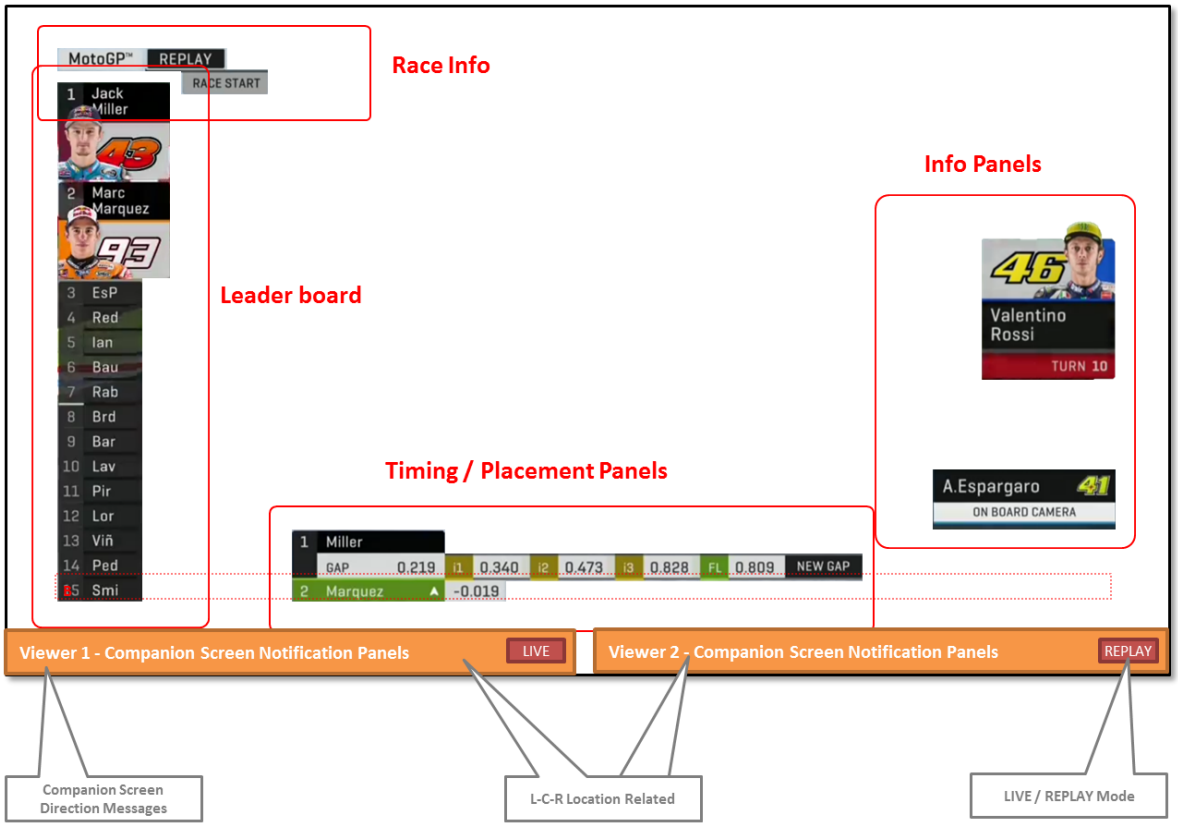


Figure 8 TV Object based broadcasting Information Graphic Schematic for a 32" screen

Key facilities required to be integrated within the TV App and support on the object based platform include:

- Race Information Area
- Leader Board Area
- Timing and Placement Area
- Information Panels (and Pictures in Picture)
- Companion Screen Alert Panels
- Live / Replay indicator

5.3.3 Tablet Companion Screen UI Schematic – Key Facilities

Early wireframes of the companion screen user interface have been developed to highlight the functionality we want to expose to the user. An example of an early wireframe is shown in Figure 9

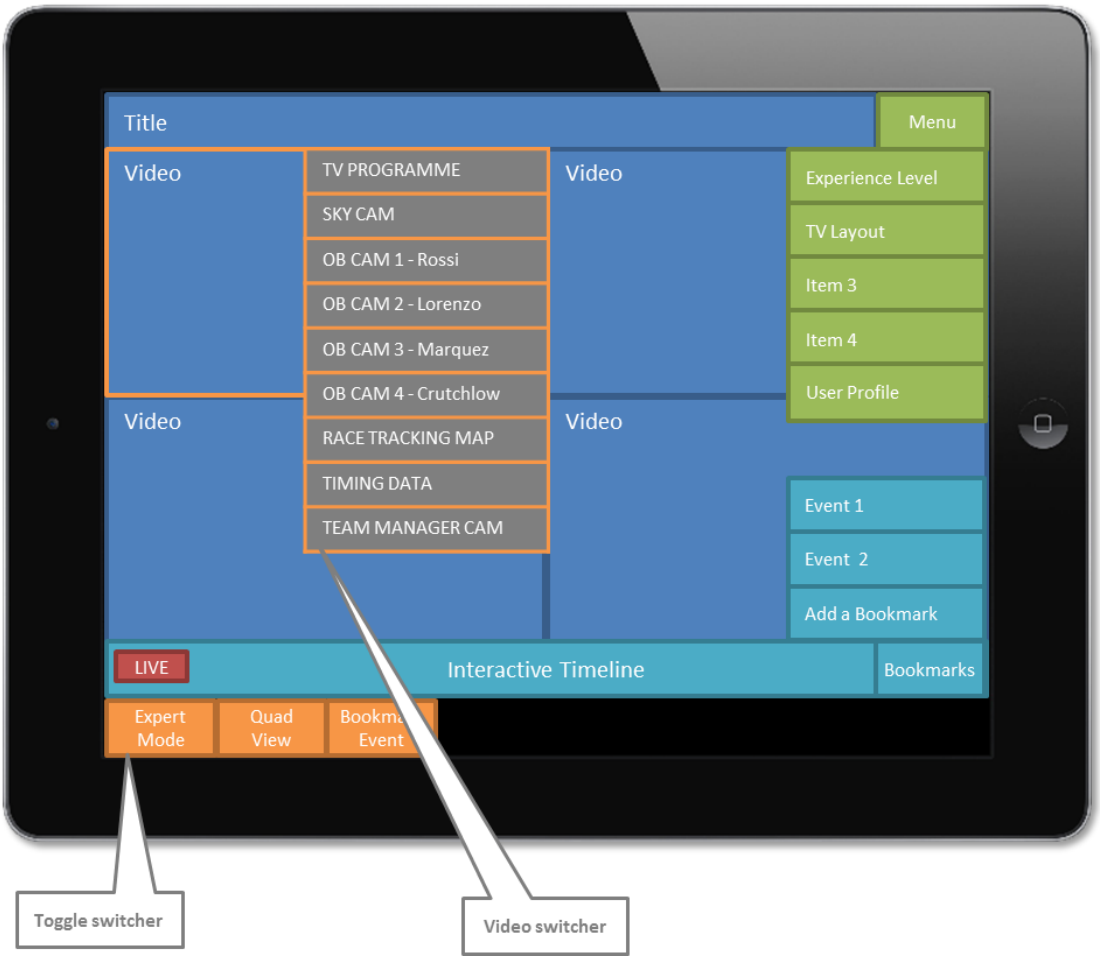


Figure 9 Tablet Companion App screen UI Schematic

Key facilities required to be integrated within the Companion Screen App and support on the Object based broadcasting platform include:

- Brand – Broadcaster Logos
- Titles – Race Name
- Profile – User Name + Sign-out
- User Experience Level – Newbie (spectacle) / Expert (analysis)
- TV Presentation – Large, Medium, Small
- Video Window Layout – Mono / Dual / Quad / etc.
- Video Window content selection
    - International programme feed
    - Helicam – camera footage from a helicopter hovering above the race circuit
    - On Board 'Bike Cam' Cameras: #1, #2,#3 #4
    - Timing
    - Tracking
- Interactive Timeline
    - Live / Replay indicator (with return to LIVE shortcut)
    - Sync with TV – On / Off
    - Scrub-bar
    - Event Markers (Producer, Broadcaster and Viewer)
        - Time + Grid
        - Time + Start

    - Time + Crash + rider name
    - Time + Crash Replay + rider name
    - Time + Run Off + rider name
    - Time + Misc. + rider name
    - Time + Penalty + rider name
    - Time + High Speed Motion + rider name
    - Time + Finish + rider name
    - Time + Parc Ferme + rider name
    - Time + Podium + rider name
    - Time + Interview + rider name
- Viewer Bookmarking
    - Time + Event Type + Viewer ID

5.3.4 On-boarding

A Broadcaster or Content Provider must provide the user with a simple on-boarding process that enables a Multi-screen synchronised experience to be delivered. The complete on-boarding experience includes many stages. We have analysed these and recognise they may include:

1. Programme / Content Alert
2. Prompt to download and install apps on devices
3. App download
4. Device association
5. User Sign-in
6. User Profile set-up
7. App introduction and tutorial

We will continue to work through the design of a sensible on-boarding process and will design and build implementations as appropriate.

5.3.5 User Profiles and Service Settings

During the initial ‘on-boarding’ set-up of multi-screen experiences, viewers have the option to create a personal profile which can be used by service providers (broadcasters, producers and content providers) to personalise the viewer experience on the TV and companion screen devices. 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.

Content service providers can use the profile and service settings data to tailor the user experience to an individual viewer or to a group of viewers.

The viewer profile should explicitly contain;

- General user profile information – Name, Age, language, etc.
- Location - Geographic Region, Country.
- MotoGP Favourites - MotoGP Rider, Team, Circuit, MotoGP/Moto2/Moto3etc.
- Audio – Ambient > Commentary
- Experience Level - Novice > Expert
- Presentation Format – Spectacle of the Event > Data and Analysis
- Participation Level - Passive > Active Participation (play-along games, etc.)

The profile could also contain service settings such as previously selected service options which have specified preferred layout options and arrangements.

We will continue to work through issues associated with the development of user profiles.

5.3.6 Schedule Reminders and Alert/Notification Messages

In our concept, we imagine that viewers can sign-up for scheduled reminders, alerts and notifications so they don't forget or miss news, events or races. This facility can also be used to update the viewer on delays in the start-time

We envision a user having a facility to set-up MotoGP 'race start' alerts but also think that, as an alternative, the broadcaster may automatically send alerts based on information provided in the users' profiles.

Alerts can be displayed on both the TV and personal device reminding the user that a MotoGP programme or specific race is about to start.

Notifications can be used to prompt the user to watch in multi-screen mode for a better experience. An option could be provided for the user to always start in multi-screen mode if supported by the TV programme.

The Broadcaster would use 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.

Real-time data feeds for both pre-programme alerts and in-programme schedule and events should be provided. 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.

5.3.7 Responsive Content Presentation

Object-based programme content should be capable of being manipulated to the producer's predefined multi-screen compositions. Layout composition decisions which have been used to create traditionally broadcast programmes should to be captured so that these can be used to control and position the object-based media objects (video, audio, leader boards, Picture in Picture camera angles, on-screen graphics, etc.)

Our object based approach to media delivery enables the content producer to cater for the capabilities of the display and user preferences so that media can be displayed in an optimum layout on different sizes of screen. As a guiding principle graphic object (such as leader board) should remain the same physical size independent of screen size, (see Figure 10 and Figure 11) but the layout of graphic objects can be changed to capitalise on available space. Responsive layout optimisation enables alternative content (such as Picture in Picture) to be displayed on the screen (see Figure 11) or alternatively leave more space for the viewer to watch the race action.

Figure 10 Example layout optimised for 32" TV screen

Figure 11 Example layout optimised for 65" TV screen

5.3.7.1 Optimised layout and scale of graphics for different sizes of TV

We propose that we should enable

- 3 presentation formats that are optimised for;
  - 20" to 32" TV – Presentation A (Default)
  - 32" to 46" TV – Presentation B
  - 46" to 65" TV – Presentation C
- Presentation formats to be predefined by Content Provider.
- Viewer control of the responsive presentation will be done via the Companion Screen App.
- Extended Display Information Data (EDID) to be used if available to select the default starting layout, if the layout has not been previously configured by the viewer.
- The viewer to override EDID control so suit their personal preference for a particular responsive presentation template.

5.3.7.2 Enhanced graphics enabled by increased screen space

We propose the following enhanced graphics

- Graphics should be designed for different sizes and scales of display.
- Distance/time between riders may be visually shown as variable gaps within the leader board.
- Favourite rider/favourite team icons may be highlighted with additional information.
- A Picture in Picture (PiP) may show favourite rider cam or main broadcast if an alternative video feed is shown as main screen.
- The Broadcaster may control graphics to match commentary by overriding Content Provider graphics control and/or controlling broadcaster specific presentation areas.

5.3.8 Extension of content across TV and connected companion screen devices

The MotoGP TV programme experience will need to be authored to support a 'multi-screen' presentation. The TV service provider will need to discover compatible companion screen displays (such as connected tablet and smartphone devices) and understand the capabilities of devices and who is using the devices.

Content Producers will author 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.

Broadcasters will utilise user profile information to customise what media components appear on the viewer's 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, Picture in Picture, etc.) are independently customisable, changing their presentation format, size, etc. based on screen capabilities and personal user profile settings.

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 MotoGP Companion App, the user will need to type in their user credentials (or other secure ID system) to confirm they have the required Sports subscription and are authorised to access content on the companion App.

5.3.9 Synchronised videos across multiple screens.

Content Providers and Broadcasters will need to provide live video (available for Adaptive Bit Rate delivery) and data feeds that can be synchronised across multiple screens. This may also require a notification to the viewer that synchronisation requires the complete experience to be watched 'Near Live' (60 seconds delay), due to differences in video delivery protocols such as Multicast Transport Stream the TV) and Unicast Http Live Streaming or MPEG DASH to companion screen devices.

5.3.10 Personalised content provision

Users will need to provide the broadcaster with information related to their personal sporting preferences. This profile information will be sport specific. For MotoGP the user will be asked to select their favourite riders and set their 'Experience Level' for that sport. The user will have the option to change these selections at later date.

The broadcaster will use the viewer's personal profile to customise what content is shown. This information will also be used by content producers to support personalising the experience. The broadcaster will hold the personal profile of the user. Note that the user has a relationship with the broadcaster rather than the content producer in this instance. The content producer will not have direct access to the viewer's profile.

Content producers will need to add 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 viewer experience levels (Newbie, Fan, Expert). A unified way of classifying viewer types may need to be defined by the industry.

Alternative audio mix and commentaries may be provided. Broadcasters may want to provide viewers with the flexibility to customise the audio mix, so they can change the volume of the commentator and ambient sounds, or listen to alternative commentaries provided by the broadcaster or an alternative content service providers. Similarly, viewers may want the ability to alter the accompanying audio mix, so they can personalise the commentary to better suit their level of understanding of the sport.

5.3.11 Multi-screen synchronised content presentation

Broadcasters and Content Providers need 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.).

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 Expert).

The viewer may be provided with alternative ways such as a 'Fan Dial' or an 'Engagement Slider' which changes the level of 'detail' provided to viewers. The slider may be labelled - Novice > Fan > Expert. Alternatively, the slider could adjust the presentation based on whether the user was more interested in the spectacle of the event or an in-depth analysis of timings and statistics.

5.3.12 Customisable multi-screen presentation space

Users will have the 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 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.

The system will need to support facilities for viewers to change the layout of individual media objects on their own companion screen devices and shared TV screen. Previous discussions 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 a wide range of devices (65" TV to a Smartphones). This is likely to require media objects to either be 'responsive' or have multiple instances designed for the device capabilities and context of use.

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

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

5.3.13 Temporal 'Pop-up' Media

The viewer should be able to 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 will enable viewers to see additional information of interest on the most appropriate display.

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

The broadcaster will decide when and 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.

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

Broadcasters may want to push interactive content (polls, votes, competitions, betting, etc.) to be displayed within the multi-screen framework, so that viewers can be further engaged in the experience. The framework must provide facilities that help direct viewers' attention between screens, so that viewers are made aware of time-bound interactive content prompts.

The Content Provider will have control of media objects which can launched and closed within the multi-screen framework, to support multi-screen prompts. The position and size of the media component is controlled with respect to display capabilities and media shown on-screen.

5.3.15 Interactive timeline navigation and Event bookmarking

The user will be provided with a timeline control capability 'video scrub-bar' enabling viewers to scrub back through video and replay bookmarked events. Interaction with the timeline will be provided through an interface on the companion screen device.

As a viewer jumps to a bookmarked event on the timeline, all linked devices (TV device and companion screen devices) will remain synchronised and similarly jump back to that point in time. In multi-viewer contexts where more than one viewer is present a facility may be provided for a viewer to continue watching live. To prevent key live events being missed by a viewer who is looking at a replay, it may be desirable for a Picture in Picture to be automatically opened that provides a view of the live race.

Bookmarks can be defined by the content provider, the broadcaster or the viewers. A 'Bookmark Bar' can be displayed on TV and companion screen for shared multi-viewer control. Bookmarks will be in 6 categories:

- Previous
- Start
- Actions
- Replays
- Finish
- Post.

Bookmarks will be titled and colour tagged to indicate Time + Event Name + Rider Name.

5.3.16 Object Based Broadcasting and Video Switching

A facility to support automatic and seamless switching between clean and dirty international programme feeds is required. This is needed to show the traditional composited on-screen graphics, when object based broadcasting driven graphics cannot be used, such as when presenting motorcycle telemetry graphics or augmented graphics that require more complex compositing.

To support this facility the object based broadcasting production service must be aware of what's being shown in International Programme Feed so that switching can be performed automatically.

5.3.17 Object Based Broadcasting Pre-Production Tools

A general pre-event authoring tool is needed to develop and test component layouts and presentation based on a viewer's profile (experience level, nationality, favourite rider and team, etc.), display size and orientation, etc. It is similarly needed to author event driven presentation macros for TV and Companion Screens (crash, tyres).

Object based broadcast driven triggers are required for swapping between composite/Object based broadcasting presentations when showing replays and pre/post race content (grid and podium).

5.3.18 Object Based Broadcasting Live-Production Tools

Object based broadcasting production will likely use real-time data feeds from current graphics outside broadcast production tools to drive the presentation of graphical elements, such as when the Leader Board is shown/hidden.

Live production tools will be needed to support real-time enhanced 2-IMMERSE interactive, responsive and personalised presentation. Timeline Event marker authoring via an operator or driven from automatic race event data feeds must be supported. The authoring and triggering of participation and Call to Action content presentation at scheduled and live events (race start, crash, etc.) will be supported.

Tools will also need the ability to timestamp graphics control generated from Object based broadcasting production tools for later re-broadcast and Video on Demand playback. Regionalisation tools for broadcasters (commentators) will also be needed which augments presentation and/or overrides any control the viewer may have to control or replace graphics.

5.4 Watching MotoGP at Home – Evaluation Plan

The prototype service will support personalised experiences that can be controlled to suit a viewer's interests in and experience of the sport. It will allow video, audio and race data to be displayed on a across a range of TVs and local small screen companion devices.

The MotoGP 'racing track' based prototype service will be based around the Great Britain MotoGP race held on 27th August 2017 at Silverstone race course.

In discussion with BT Sport and Dorna we have agreed to run the MotoGP at Home trial as two trials.

5.4.1.1 'Live' Production Trial

In discussion with BT Sport and Dorna it has been tentatively agreed that a live production trial will be undertaken during the UK Silverstone MotoGP race using production feeds from Dorna's Outside Broadcasting (OB) facilities.

A single Production Trial at Silverstone on Aug 27th 2017 which will focus on testing our live production tools and a series of 'as-live' User Trials that will take place throughout September and October 2017. This approach will reduce risks associated with running concurrent trials based on unproven live production tools and enable iterative refinement of the platform as the project gathers insights across the series of user tests.

Production requirements for the 2017 trial will be refined with Dorna, BT Sport and North One Production[4] during the course of this year. We will look to further develop our understanding of current production workflows in discussions held with stakeholders in 2017.

This trial will be focused on production tools and the production workflow required to present a live broadcast. It will involve:

- Live production tests at the OCTO British MotoGP Race, in which the production decisions made will be recorded so that they can be re-used in later replay for the 'As Live' public trials and later demonstrations.
- Scale = Testing and trial over 2 days.
- Location = Silverstone.
- Triallists = Project Team and BT Sport/North One Outside Broadcast Operator.
- Trial Equipment

[4] North One is a TV production company that works with BT Sport for many live sports productions.

- BT 'Owl Van[5]' (An Outside broadcast van)
- Live video and data feeds
- 2-IMMERSE Production tools
- EVS[6] Video Recorders and Data recorders (to enable replay)

- Evaluation = Platform Tech Test, Staff Interviews with staff in the outside broadcast vans

5.4.1.2 'As Live' User Trials

A series of trials focused on the enhanced audience experience. It will involve:

- A series of 4-8 'As live' closed broadcast trials of British MotoGP Race run throughout September and October 2017.
- Scale = 40-60 Households (80-120 individuals) and 8 multi-user lab trials (20 individuals).
- Location = Triallists own homes and at BT/BBC research labs.
- Triallists = Households with multiple people interested in MotoGP.
- Trial Equipment = Set Top Box (or similar PC device) and Companion Devices (iOS and Android tablets and smartphones) provided by 2-IMMERSE, with the option for Triallists to use their own TV and companion screen device if suitable.
- Evaluation = Platform Analytics, User Questionnaires and Ethnographic Study.

The trial will use the available video and data feeds provided through the existing MotoGP rights deal agreed with broadcasters. These rights would typically 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.

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 Bike Cam #1 • Feed 2: On Board Bike Cam #2 • Feed 3: On Board Bike Cam #3 • Feed 4: On Board Bike Cam #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.

[5] The Owl Van is a small outside broadcast truck that was first used by BT Sport to support a particular camera rig that appeared to have two large eyes, like an owl.

[6] **EVS Broadcast Equipment SA** is a Belgian company that manufactures live outside broadcast digital video production systems. Its recorders have become the dominant standard for broadcasters worldwide. Their XT3 production video servers enable the creation, editing, exchange and playout of audio and video feeds.

The company states that over 5,000 operators of all nationalities now use their applications on a daily basis.

Content type	Content description
Real-time Data	• Timing • Tracking visualized on circuit maps • Rider standings
Editorial	• News stories • Pictures galleries • Social media with riders and teams • BT Sport presentation and commentary

Figure 12 Overview of content available for MotoGP Apps and Services

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 via North One Productions.

5.4.2 High-level evaluation questions

The evaluation will address two broad areas: the viewer experience and the Production and delivery workflow.

5.4.2.1 Viewer Experience

- Have we provided a more compelling experience for viewers than currently offered?
- Has our attempt to provide a multi-screen responsive personalised experience increased viewer engagement?
- What facilities worked well (enhanced the viewing experience) and what needs to be improved?
- How much do viewers value the enhanced experience? How much would they be willing to pay for such services?

5.4.2.2 Production & Delivery Workflow

- What are the challenges associated with producing object-based multi-screen responsive personalised entertainment?
- Did our platform resolve these challenges? What enhanced or new facilities may be required for use within industry?
- What is the impact on current workflows and what needs to change in production and delivery?
- What's the overall financial impact in delivering these forms of enhanced multi-screen entertainment?
- Does the producer (Dorna) see value in providing broadcasters with content as objects which can be flexibly presented?
- Do broadcasters (BT Sport, BBC) see value in the provision of personalised experiences through adoption of object based broadcasting?
- Do third-parties see value in providing their services via our platform?

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 a Pub".

This service innovation relates to an experience designed to suit UK city centre pubs showing sport. It will mix viewing on multiple fixed screens 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

The following Guide Scenario helps readers picture the proposed Service innovation prototype. It features Sue and Dave who are married couple, and their friends Mo and Rafa. Sue and Dave are Arsenal fans, while their friends Mo and Rafa support Man City and Real Madrid repsectively. They all meet to watch football regularly in their local sports bar – the Turf Bar and Restaurant.

Chris is the landlord at the Turf Bar and Restaurant which is in North London. Sports events are a big draw for Chris's customers and he tries to deliver the best sports viewing experience. His venue is one the most popular places to watch big football events in the local area and, due to it's proximity to Arsenal's Emirates Stadium, is particulary popular with Arsenal supporters when the club has a game live on TV.

6.1 Watching Football in a Pub – Guide Scenario

When Arsenal play Manchester City in the FA Cup semi-final, Arsenal supporters Sue and Dave know that the next best thing to supporting their team at Wembley will be to watch the match at their local sports bar in north London. Chris, the landlord has installed a Multi-Screen TV system that includes a super wide video wall, interactive booth screens and support for personal mobile devices. They know that in addition to the big match atmosphere, the venue delivers a unique view of the game that they couldn't get by watching at home. Chris is also sure to set the bar's multi-screen system to the 'Arsenal Supporter' experience, as he knows the majority of his locals are Arsenal fans, (except those that are fans of local rivals Tottenham of course!).

Dave and Sue know that they will be able to personalise their match experience either by booking one of the bar's booth tables, which gives them access to an interactive touchscreen, or by downloading the pub App and connecting to the venue's WiFi hotspot.

Chris finds that the video wall is a big pull for his 'lean-back' customers who want the best curated view of the match. At its heart is the broadcast mix of the game made available by the TV Channel for home viewers; but as the video wall is a super wide canvas, customers at the Turf Bar get additional live video of the crowd and manager reactions. Positioned either side of the match view, these videos help the partisan crowd to feel connected with the crowd in the stadium; they add depth and a wider narrative to the events as they unfold live. Sue and Dave think it's great as it adds to the atmosphere when either side score a goal, miss a golden chance or hit the woodwork. Chris say's it makes watching matches at his bar more like being in the ground and brings a stadium atmosphere to the venue on big match days.

Chris also has lots of other screens installed around the bar so everybody can get a good view, and for concurrent games he can show different games if customers ask for them. But for big games when he uses his pull down projection screens, many of the smaller screens are duplicating the view for customers. So Chris takes advantage of the multi-screen system that allows him to use these smaller screens for a mixture of food and drink promotions, match stats and replays.

The view Sue and Dave have means they can watch the whole game like they are sitting in the stands above the goal at the end with the Arsenal fans, or glance across and watch replays of the key incidents at any point, even during play when the main broadcast mix can't cut away from the live action.

Chris also has several booth tables available in the bar that include fixed interactive displays. These are used for kids' entertainment and games at other times, but during matches, customers at these tables can use them to customise their view of the match and delve further into the detail of the game as it unfolds. Sue and Dave sometimes book one of the booths so they can use they can access different video and graphic features for the game, including tactical views of the whole pitch, player cams and key replays they wish to see again. Sue especially loves using the player cam feature to follow key players such as Arsenal forward Alexis Sanchez. It allows her to see all of his off the ball movement that is never shown in the broadcast mix of the game. The interactive screen also allows them to delve into the performance data of the match and compare team and player performances to provoke and settle discussions as the game wears on. All of these alternative views and data remain in sync with the big shared screens within the pub. Dave says it is like having his own living room, but with added atmosphere of the bar!

Dave's friend's Mo and Rafa often join them to watch games at the bar. Mo happens to be a Man City fan, so is somewhat in the minority for the match today. He is fine with that and still wants to watch the match with his friends and join them at the booth they have booked. Rafa is a lifelong Real Madrid fan, and although he loves the Premier League, he has no particular favourite team.

The friends negotiate that the default view on the booth screen is a neutral supporter view – showing the broadcast mix and both managers for this game, so Mo can see the live reactions of Pep Guardiola (Man City Manager) at the same time Dave and Sue can still see Arsene Wenger's reactions (Arsenal Manager). Rafa is just happy that he can select the goal alerts for Real Madrid and Barcelona matches to be shown on the booth display. That way he can keep track of the La Liga title race without taking his eyes of the match to check his phone all the time.

For the rest of the supporters in the bar, who can't interact with one of the booth screens, they can still download the 'Broadcaster Pub App' on their mobile devices and access a subset of the interactive features from anywhere in the pub. Even when they have a booth table - Dave uses the mobile app to access replays without interrupting the view of the other three, and finds it easier to quickly post comments on highlights than to use the booth screen. As all these comments are fed back to the broadcaster, sometimes Dave even sees his comments overlaid on the replays as they are repeated on screens around the bar. Sue uses the App mainly before the game and at halftime to participate in polls and games run by the broadcaster and venue, which could see her predictions or knowledge earn her kudos or rewards within the venue.

6.2 Watching Football in a pub – What's changed?

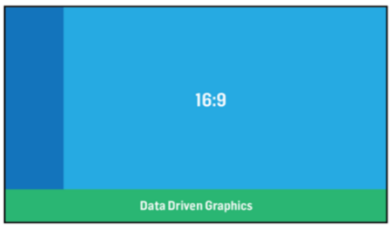
We have recognized some things that clearly don't work. We conducted some lab tests based on rendering to multiple screens that can all be seen at the same time, camera views of the game recorded from different vantage points/angles. Such representations don't work; they are confusing. They offer no single point of focus and break cinema conventions (such as crossing the line) and this probably contributes to making it difficult for the viewer to assimilate the emerging sporting narrative – you just can't follow the game. This observation has helpfully limited the number and type of shots that it seems sensible to incorporate in any multiple screen representation of match.

Figure 13 A screen grab from a render of showing three synchronised shots taken from the match. Whilst not obviously incomprehensible as an image - the video version soon become a very uncomfortable watch.

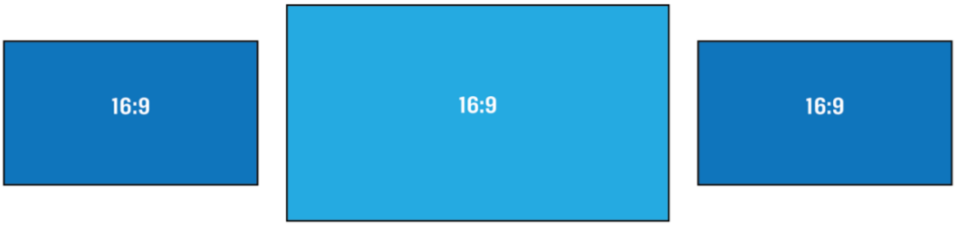
Following market observations and discussion with pub owners we have developed an increased focus on features under the control of the pub owners, i.e. what comes out of the speakers and what is shown on the screens. We believe these shared devices have a greater impact on the social nature of the pub, which is one of the things pubs "sell", and are deemed a better focus for design investment than is the exploitation of personal devices which we suspect will detract from, rather than enhance, the social crowd experience that we think is key to creating better atmosphere for watching football.

In response to this shift in focus, we have developed the concept of a primary viewing area see Figure 14. In our definition, the primary viewing area is the screen, or array of screens, that a punter may easily assimilate without having to move their heads. Figure 14 shows some of the constellations that could be found in pubs.

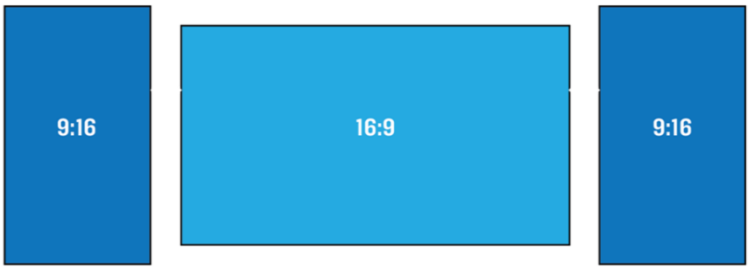
1. Single screen



2. Landscape – Landscape - Landscape



3. Portrait – Landscape - Portrait



4. 3x2 Video Wall

Figure 14 Illustration of different screen layouts that may constitute a primary viewing area. Of these option 3 is the only one we have not seen in UK bars carrying sport.

Extensive testing took place based on capture of 12 isolated cameras feeds[7] from the 2016 FA Cup Final leading to the development of some design options for a primary viewing area. These concepts have been tested with pub owners, pub professionals, brewery executives, BT Sport production professionals and even school children. In addition we also have an abiding, though untested conviction that the use of audio objects and the ability to affect the relative volume of commentary and crowd ambience will significantly affect the potential atmosphere developing in the pub during a match.

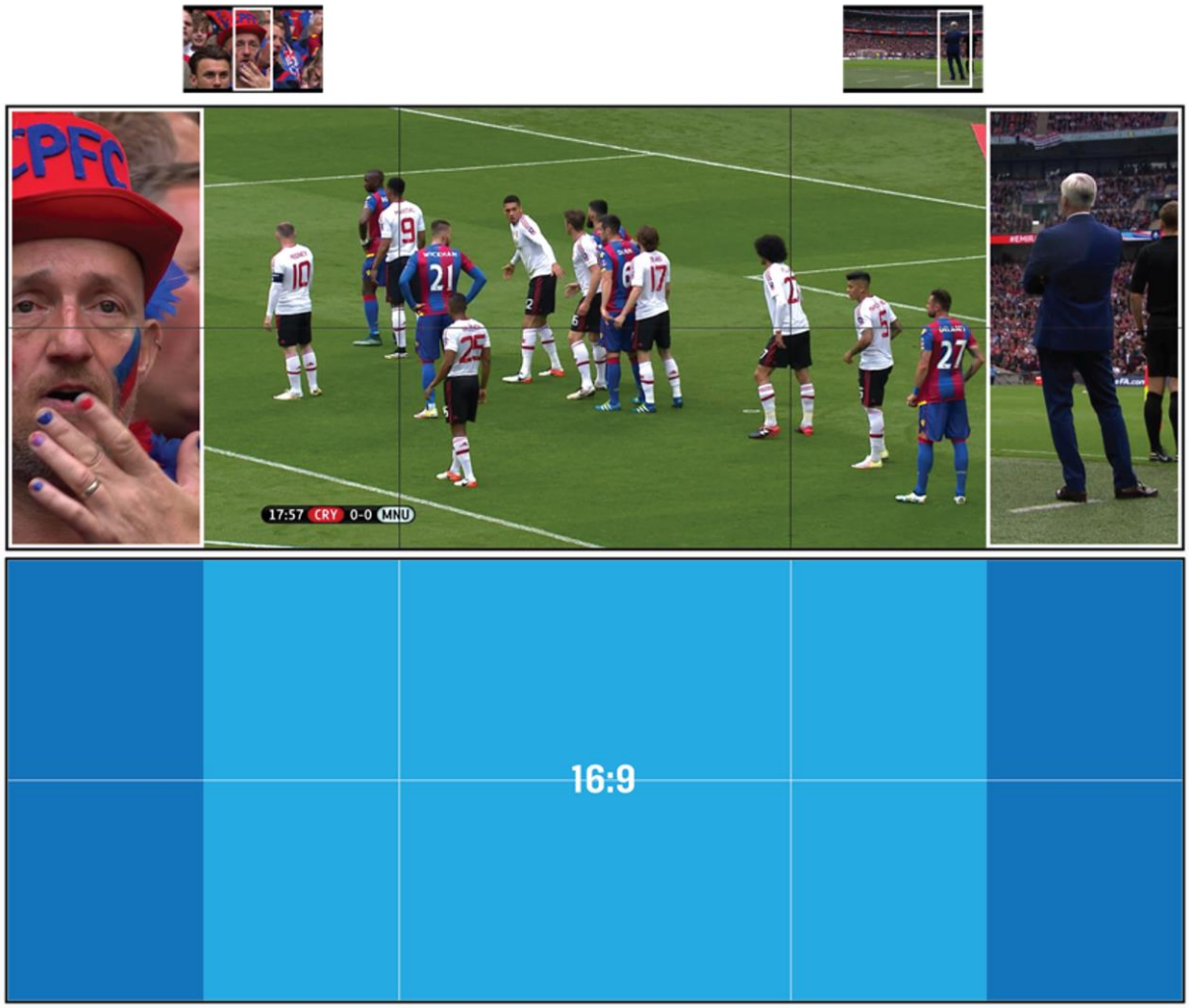


Figure 15 Showing how a multi-screen layout can be created from three landscape feeds from the current cameras. The portrait style feeds either side of the main broadcast feed could be generated from intelligent cropping from existing camera feeds or (better) by creating a new assistant director role responsible for the augmented content.

[7] Isolated camera feeds are feeds from a single cameras and in our context they related to cameras filming live events. They contrast from the edited programme feed which will include video from many different cameras edited together and overlaid with graphics and additional data. Isolated camera feeds are essential elements in the production of TV but their output is not normally available to users; capturing recordings of theses isolated camera feeds is essential for our experimental work.

In response to this shift in focus, we have developed the concept of a primary viewing area (this is the array of screens that a punter may easily assimilate without having move their heads) and developing ideas about what should be populating each of these screens.

Further we have recognized and explored the potential for partisan mixes – customized selections of audio and video assets - to enhance the feelings of empathy a partisan crowd may be able to develop during a game. Design ideas around these thoughts have directed our thinking significantly.

6.3 Watching Football in a Pub – Prototype service description

The following sections describe in a little more detail the capabilities and features of the system that are implicitly required by the guide scenario.

6.3.1 Supporter Experience Options & Levels

At the heart of the multi-screen experience is the flavour of experience that the viewers wish to have when watching a live match in a public venue. The perfect experience can vary based on group and personal loyalties, as well as personal interest in specific players and aspects of the game such as tactics and insight.

In our guide scenario, Dave and Sue are Arsenal supporters, Mo is a Man City supporter, while Rafa is a Real Madrid fan who has no favourites in the Premier League. Current services deliver a version of the match that aims to be impartial in the hope that it offend no one and act as a fair representation for the neutrals too (is there such a thing as a totally neutral viewer in football?).

The multi-screen system for Football in Pubs is a paradigm shift in production, delivery and consumption of sports content. The system will allow viewers to receive different experiences of a sports contest based on their individual (or group) support for one participant in the contest over the other. Even if neutrality is expressed by the viewer(s), the system will still extend experience of live sports available in venues by bringing greater atmosphere and personalisation to the experience of watching a live match across multiple screens in a public shared venue.

We envisage support experience options that can be set at one of 3 levels for each match event: Team A, Team B or Neutral, and that these levels can be set for three different contexts within in a venue:

- At an individual level on a personal device (mobile handset screen)
- At a group level on small group shared devices (booth screen)
- At a venue level on venue shared displays (video wall and other distributed screens)

Within a single venue, different experience options can thus co-exist so small groups or individual viewers can maintain neutrality (or support for a preferred team) independent of the experience options selected for the venue.

We also anticipate that the supporter experience selected can differ from the user's Fan setting. For example Rafa can define himself with his profile as a Real Madrid fan, but choose to select the Arsenal supporter experience for this match because he is swept up in the atmosphere of the North London bar.

Similarly, Dave and Sue are Arsenal supporters, but may wish to support Man City against Man Utd because of solidarity to their friend Mo – and because they always want to see Man Utd lose!

User – The user can select their preferred supporter experience on a mobile device to reflect their individual loyalty (or impartiality) for the game. For those choosing a side, content will be filtered to emphasise the preferred team. Users will also post all their comments, predictions, reactions and votes – tagged to that team.

User Group – A user or group of users can negotiate a preferred supporter experience for everyone on their table. Layout templates will be populated with content with an emphasis on that team.

Venue – A venue manager can manually select or automate the preferred supporter experience for the public shared screens in the venue. A manual selection would fix the experience option irrespective of the selection customers in the pub have on their personal or shared devices. Enabling an automated selection would allow the public shared screens to inherit an experience setting based on the balance of multi-screen customers logged in within the venue.

Broadcaster – A broadcaster can use the supporter experience setting to deliver the correct flavour of content to each screen, including video, audio, graphical and data content. To support the experience options the broadcaster will have to capture, produce and distribute a range of assets, many of which will not be utilised in all venues, or by all viewers. Automation of capture and production workflow is key for broadcasters to offer these options for minimal additional production costs. Formatting and structuring of content for delivery to layout templates in differing multi-screen venues will be key to retaining production quality in a more flexible system.

6.3.2 Profiles and Service Settings for Users & Venues

When Chris had a multi-screen system installed at his Turf Bar venue, a venue profile was created for him by the installer. Chris and the installer set up a series of templates to define the layout and content choices the multi-screen service offers to customers at different times. This information is stored within the venue profile and can be edited by Chris at any time via his 'Venue App'

In our guide scenario, customers Dave, Sue, Mo and Rafa have each previously created personal profiles which can be accessed by both the broadcaster and venue manager to provide customisation of devices in the multi-screen system.

User – To access enhanced multi-screen features on personal devices in the venue, customers must download the 'Pub App', create a personal profile and login to the venue. Broadcasters, producers, content providers and venue managers can use this profile to personalise the experience for individuals and groups. The profile is further developed as the viewer uses the service. The user is able to see and edit details in their user profile such as Fan setting (the team they support).

Venue – Managers of local venue (pubs and bars) can use their venue profile to define and automate the layout and availability of content across the multi-screen system within the venue. Venue templates defined when the system was installed are used to control the layout of content available from the broadcaster, advertisers and the venue/pub chain. These templates can be adjusted manually by the venue manager (via the 'venue app'), or driven automatically based on the user profiles of customers present. E.g. 80% customers logged in as Arsenal supporters in bar? Then change the shared layout to 'Arsenal supporter' experience automatically.

Broadcaster - Content service providers can use the profile and service settings data for users and venues to tailor the user experience to individual viewers and groups of viewers (venues). The user profile contains a range of information about the viewer; including football specific preferences (favourite players, teams, and competitions) as well as venue preferences (favourite/local venue) and viewing history (matches watched). Service settings similarly contain information on previously selected service options, preferred layout options and prior saved arrangement settings for mobile and shared displays.

6.3.3 Schedule Reminders and Promotional Messages

Dave receives an alert on his personal device reminding him that Arsenal will be shown live in the Turf Bar and Restaurant this weekend as it is his preferred local venue. Dave can login to the App and respond with 'I am watching', 'I am not watching' or 'I am watching elsewhere'. Advanced features may be linked to the venue to allow him to book a booth table or receive promotions from the venue.

Broadcaster – regular prompts are provided both on the shared screens, booth displays and personal devices (via app) in advance of the match day to remind the user of the event at the venue, so they can plan their attendance.

User – The user has previously downloaded the Pub App having seen the promotional message within the bar or used the App at a previous occasion. Doing this required the creation of a user profile. Within that profile, the user can define a favourite venue and a favourite team. The user can then subscribe to live match schedule reminders for teams, competitions or venues.

6.3.4 Pre-Broadcast Content & Prompt to install BT Sport 'Pub App'

Chris the venue manager has set the multiscreen system in the Turf Bar to pre-broadcast mode so the screens can show some football content before BT Sport starts their match broadcast. It uses a combination of broadcaster video on demand content, external advertising assets and food and drink promotions he is running for the big event.

Dave, Sue, Mo and Rafa have arrived at the Turf Bar for lunch before the match. They take their seats at the booth table they have booked, but interactive multi-screen features are not available until an hour before kick-off. Rafa, who has not used the Pub App before is prompted by screen adverts (and his friends) to download the App and setup his profile while they are waiting for their food.

Broadcaster – On demand video, graphics and data related to the match is provided to the venue for use on screens before the broadcasters programme goes live to air. This content is distributed across the multi-screen system based on the venue profile settings. There are also prompts to encourage new users to download the 'Pub App' which the broadcaster has provided in App Stores.

Venue – venue managers can choose the layout and prominence of broadcaster content, paid (multi-screen) adverts and venue promotions during this pre-broadcast period. Multi-screen templates are available for independent venues to create their own promotions, while franchises have promotions provided by head office.

User – Users who have not used the 'Pub App' before can respond to prompts on shared screens to download it to their personal device before the match. In doing so they will create a quick user profile. Existing users can launch the Pub App and check into the 'Turf Bar'.

6.3.5 Multi-screen prompt at Start of Broadcast

Chris has set the multi-screen system to switch to broadcast mode as soon as the BT Sport broadcast goes live. The system then applies the relevant supporter experience setting to control the way the content provided by the broadcaster is laid out on the multiple screens.

Dave, Sue, Mo and Rafa all notice that the match broadcast has started, but also receive an alert to their personal devices informing them that the interactive features of the App are now live. Tapping on the alert logs them into the app, including the event (match) and the venue (Turf bar).

Sue is sitting next to the booth screen. There is a prompt to enter 'Match Mode' on their interactive display Sue uses the touch screen to enter the event and instantly engages her friends in the trivia quiz provided by the broadcaster.

These descriptions make a number of assumptions about capabilities and features required in the context of users, broadcasters and producers. These are described in more detil below:

User – The viewer has signed-up for broadcast alerts on their App (these can include BT Sport news, about upcoming games).

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 event. The push alert service should be capable of being presented across a broad range of devices including smartphones, tablets, venue shared displays (fixed non interactive displays) and smaller interactive displays (booths).

Production – Real-time data feed for both pre-programme alerts and in-programme schedule and events (kick-off, goals, full time). All this data feeds can be driven, in real-time, by OPTA[8] data feeds from companies like OPTA[8] although local sync of delivery will be required to avoid content 'spoilers'.

6.3.6 Responsive Layout based on Venue Template

Chris has two big screen areas for watching the match of big match days. One is the super wide video wall, the second is a pull down projector he uses in the outside bar area. Although he selects the Arsenal supporter experience for both, the layout is altered based on the size and aspect ratio of each display, and the proximity of other screens to the user's field of view.

The super wide (eg 21:9) video wall can include a centralised broadcast feed and constant match data bar. The remaining screen real estate on each side is utilised for portrait video feeds of the Arsenal manager and Arsenal Crowd. The projector displaying 16:9/4:3 projector does not have the benefit of this additional screen real-estate so defaults to an L bar layout, with the data bar and a single 'slim' portrait feed of either the Arsenal crowd or the Arsenal manager.

These responsive capabilities will have an impact on both production and broadcasters. These are expanded *below:*

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, match graphics, Picture in Picture camera angles and IPP (In Programme Promotions). An example of this being when commentators are referencing on screen graphics elements such as the current possession % for each team or an IPP graphic advertising an upcoming game. These elements may not be shown (overlaid) on the broadcast stream if other areas of the multi-screen system allow them to be displayed with equal or increased prominence without obscuring the view of the game.

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

6.3.7 Responsive Content based on Venue Experience Setting

On match days Chris, the bar manager, is very busy so he is happy to leave the multi-screen system to present the match based on the predefined venue profile. The service is aware of experience settings and content layout template that Chris has defined within the venue profile of the Turf Bar. The service combines these with live broadcast content to automatically deliver the correct 'multi-screen experience' that Chris wants for his customers.

This vignette has the following implications for Broadcasters, Venues and production teams:

[8] OPTA describe themselves as "The world's leading sports data provider" with a mission to create a global standard for live sports data. They create and sell sports data raging from live in-match data (score, passes completed, distance run etc.) to league tables, player statistics etc. to broadcasters, publishers and to sports clubs themselves as a training aid.

Broadcaster/Venue – The BT Sport programme has been authored for a 'multi-screen experience'. The TV service follows the layout template in the venue profile, and then populates it with the correct content based on the experience setting in the venue profile. The service understands the capabilities of the venue screens. E.g. Is it a video wall, single screen or an interactive booth?

Production – The match production team have authored 3 predefined (Team A, Team B or Neutral) experiences, which are optimised single screen compositions, which can be used by the broadcaster to populate the venue layout template. Which experience is selected to be delivered is defined by the experience setting predefined in the venue profile.

Production/Venue – At installation the venue manager and installer have defined a number of predefined content layouts for the venue, based on the unique shape and size of the venue and layout of screens within it. Personal preferences of the venue manager are also taken into account as to what he/she wants on specific screens at specific times. These layouts can be defined at a single screen level (full screen or L-bar on the projection screen?) but also with context screens working in unison (e.g. what videos are displayed across 3 adjacent screens?).

6.3.8 Personalised content based on personal device settings

Dave and Sue automatically receive the content options for Arsenal on their personal device as they are returning users who have defined Arsenal as their favourite team. Likewise Mo receives the Man City content options. In pre-match this means they receive a 'supporter' trivia quiz and polls that focus on their favourite team. As a neutral, Rafa is prompted to choose a team to support (just for today) in the match. He decides to stay neutral (this captures his personal experience setting for the match) and ensures he receives trivia quiz questions and polls for both teams. The group can't login to the booth screen with any of their personal user ID's (we felt that physical proximity to the device was key to controlling the booth screens, for example if we allowed personal ID login to booth screens a third party close to, but not in the booth might take control of the way the games was being presented Limiting the control to those that had physical access to the touch screens seemed the most straightforward option. By default the screen inherits it user experience from the venue setting (which is Arsenal). But as previously agreed with Mo and Rafa – Dave quickly switches it to the Neutral experience setting to reflect the compromise reached by the group at the table.

The behaviour described above has the following implications for broadcasters, users and producers

Broadcaster/User – The BT Sport programme has been authored for a 'multi-screen experience'. The TV service follows the layout template in the user profile (for personal devices) or the experience setting selected on the booth for each match. Content then populates each users Personal or Booth screen with the correct content based on their selected experience setting.

Production – The match producer has authored 3 predefined (Team A, Team B or Neutral) experiences for interactive content and data. Which experience is delivered to each user is defined by the experience setting predefined in their user profile, or selected at login.

6.3.9 Synchronised live videos across multiple screens.

The Turf bar's main video wall shows the main broadcast mix of the match as well as videos of the Arsenal crowd and manger. Chris has also selected a number of different angles of the match on the smaller screens around the bar. The screen behind the bar is set to the Spyder cam[9] *feed above the pitch and the 32" screens in the outside bar area with the projector are set to a view from the Arsenal end of the Wembley and player cam view of Alexis Sanchez. Chris keeps these views fixed for the remainder of the match so customers get to know where*

[9] Spyder Cam is a camera used in televised sports coverage in to provide a birds-eye view of the game in sports stadia. Spyder Cam is suspended above the pitch via four wires attached to each corner of the ground and manoeuvred by an operator to follow the action from a height of 10 to 40m above the pitch.

to look for the content. This complements their view of screens carrying the broadcast mix of the match. All of these videos, including those selected by customers using the booth screens stay in exact sync across the venue.

The vignette above carries the following implicit requirements for Broadcasters, producers and venues

Broadcaster – Provides video player 'objects' which support live video synchronisation shown across multiple screens. Provides data player 'objects' which support live data presentation.

Producer – Provides multiple Team A, Team B or Neutral 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.

Venue: Makes decisions on which content and data is displayed were and when based on predefined rules. These can be predefined before the match, or edited in real-time by the venue host.

6.3.10 Personalised content provision

Mo's smartphone provides more general information about the Man City players and their team. This level of detail is perfect for his interest and 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 Football the user has selected their favourite team and players (these can be fan favourite players from teams the user does not support). The profile also contains information on the interest of the user with regard to that sport – video replays, social debate, or tactical and statistical insights. These are presented as friendly viewer traits such as 'Replayholic', 'Comment King' or 'Stato'. Mo has previously stated that he is a 'Replayholic' because he likes accessing the replays on his personal device, but is less interested in the stats and tactics.

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 (replays, polls or discussion topics) may need to be created to suit different experience settings – team A, neutral or Team B. A unified way of classifying viewer types may need to be defined by the industry.

6.3.11 Multi-screen synchronised content

Chris doesn't even think about the fact that the multi-screen system in his venue can delivers synchronised experiences across the fixed screens (Video wall, distributed screens and Booth displays). This synchronicity of delivery creates greater impact for his customers when watching sport, but also for advertising and local promotions.

Synchronisation of content sources is expected by users but strangely, is non trivial. It has the following implications for Broadcasters and Producers

Broadcaster – The broadcaster needs to support facilities that can synchronise different media (video streams, data graphics, archive video, advertising and venue promotions, etc.) shown on screens across the venue. Media elements can be pre-authored before the match 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 (goals, penalties, sending offs, etc.).

Production – Content must be created with personalisation/customisation in mind. Different event content may need to be created for this use-case. Such content should be designed for different experience settings. (e.g. Match content - synchronised delivery of starting line ups before the game may provide more information on one team than the other. Venue Promotions – synchronised delivery of local drinks and food promotions would have to provide a 'template' into which video and graphical content could be created by the venue manager).

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

Half-way through the match Dave receives a notification on his tablet to place a spot bet on who will win the match. A synchronised alert is also displayed on selected screens of the multi-screen system within the Pub, so that he doesn't miss the notification on is personal device. Sue is similarly prompted to answer a viewer poll on which team will score next.

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.

6.3.13 Other possible user stories

The following three placeholder user stories should also be considered. They may be developed, discarded or adapted in due course:

- Changing the orientation of the Booth Display
  The majority of venue displays with the Pub (video wall and standard screens) are fixed in location and orientation (portrait or landscape). While Personal devices can be rotated to best suit the experience. Should the Booth Display be rotatable? This would provide greater flexibility to layout of standard 16:9 video – with landscape providing full screen or quad view layouts, while portrait could provide dual screen layout.
- Commenting on highlights
  Pre-existing video assets (replays) allow viewers to add 'social comments' which will be associated with the asset and its context. These comments can be moderated and production tools allow the best to be re-broadcast as an overlay to the video later in the event.
- Bookmark Video
  Facility to bookmark parts of the broadcast for later review and potential sharing on social media networks.

6.4 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.

6.4.1 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.

6.4.1.1 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.

6.4.1.2 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.

6.4.1.3 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 (where required) to audiences in safe environments. This would reduce the need to support multiple device types and or operating systems.
- 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[10] (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 (e.g. ChyronHego TRACAB optical player 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.

6.4.2 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.

10 FA Community Shield is English football's annual match contested between the champions of the previous Premier League season and the holders of the FA Cup at Wembley Stadium

The BBC and BT Sport broadcast one semi-final each, 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. The date for the 2018 Final is not yet fixed but is expected to be the fourth Saturday in May.

7 Summary and Conclusion

Four service prototypes, based on innovations developed in this project have been described. The intent of the project is to use these exemplars to help develop a platform that will enable cost effective development of multi-screen experiences in the future. As such a key objective is to use the experience of these productions to refine and improve both the design of the experiences and the design and implementation of the platform used to deliver them.

The first two, 'Theatre at Home' and 'Theatre in Schools' describe experiences using the performances of the Royal Shakespeare Company for audiences at home and in schools. The Theatre At Home Trial has been completed and some reflection on the experience are included in this document though the formal evaluation process and full results are reported in D4.2 [1]. These include the following key conclusions:

1. Users are almost universally sympathetic to the idea of making Watching Theatre at Home a social experience and were positive about the idea of the having easy access to the additional facilities (Context; Chatter; Channels and Crowd). This is of course encouraging.
2. Users express a desire to have more control over layout choice. This is a clear expression of desire but we need to test whether they actually manage what we expect to be an enhanced cognitive load associated with managing not only the main and ancillary content but also the way those features are presented.
3. Users recognised, and were sympathetic to, the reinforcement of real world rituals from the theatre in the development of the online facsimile. This encourages us, as experience designers, to identify rituals that may exist in other context and to consider how they could be implemented within on-line facsimiles of live events experienced in person.
4. It is remarkably difficult to recruit trial pairs who could effectively coordinate a time to watch a 3 hour play. This difficulty in itself may raise concern as to whether such a service would be effective – particularly if is limited to a pair-wise experience. Enabling such a service to find an audience would be tricky but improved on-boarding processes, possibly engaging with Facebook and other social network services, in order to help identify a likely audience may help.
5. We should expect to identify improvements in the finer details of our experimental set up when deploying in highly situated environments (i.e. users own homes). In our case one insight was that whilst WiFi is, in principle, adequate for supporting such services the presence of strong enough WiFi in all triallist's homes cannot be guaranteed; to counter this we enforced a wired connection for our Mac Mini and used these as WiFi access points to provide connectivity for the companion devices. We will take forward an expectation that we do even more detailed pre-tests and trials in highly situated environments before progressing to the full trials.
6. We achieved synchronisation by choosing to have one of the clients as a 'master' and the second client as a 'slave'. This was, in many ways a good decision; it enabled us to achieve inter home synchronisation of the experience. However it created a dependence, for the device that became the slave, on the master retaining a network connection; when WiFi was poor, and the master lost connection, the synchronisation was lost and this broke the experience catastrophically. A technical more complex solution based on a cloud base synchronisation approach has been designed and will be developed for the theatre At School service prototype.
7. We learned to tighten our DevOps processes. In particular we learned that testing with truncated experiences (20 minutes say, rather than the full 3 hours) can fail to identify some temporal effects in the set-up such as missing the fact that having key expiries after 30 minutes of non-use is too aggressive (in some cases) since some users will not use the companion screen for periods as long as 30 minutes. With the aggressive key expiry the companion screen lost context and did not work. For the future we will take more care to

consider temporal efforts and again conduct more pre-tests under full test conditions before progressing to the real trial.

For details of the evaluation method and the detailed findings please refer to that document. (see: www.2-immerse.co.uk)

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.

Guide scenarios are used to help user imagine the experience. The implications, for broadcasters, producers and venues, of different aspects of the experience are described in more detail to provide implementers with more insight into the capabilities and changes in practice that will be required to realise this vision.

The service prototypes have been developed based on a deep understanding of the market context in which they will operate. Some of this insight is included in Annexes.

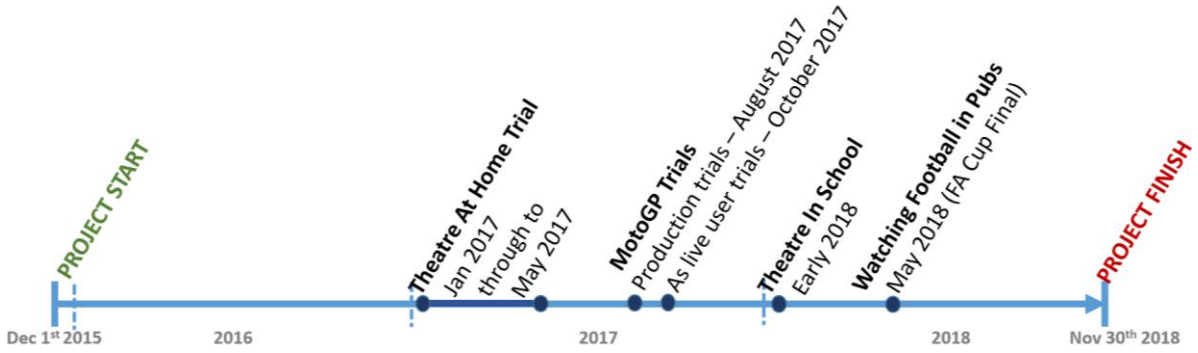


Figure16 Time line for the delivery of the trials related to the prototype service use cases.

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 – Theatre at Home

The content in this section of the annex was previously in the main body of the text. The content describes the market and products and services that already exist. These remain relevant but the content is shown in this Annex to allow the reader to focus on the work done in this project.

9.1 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.

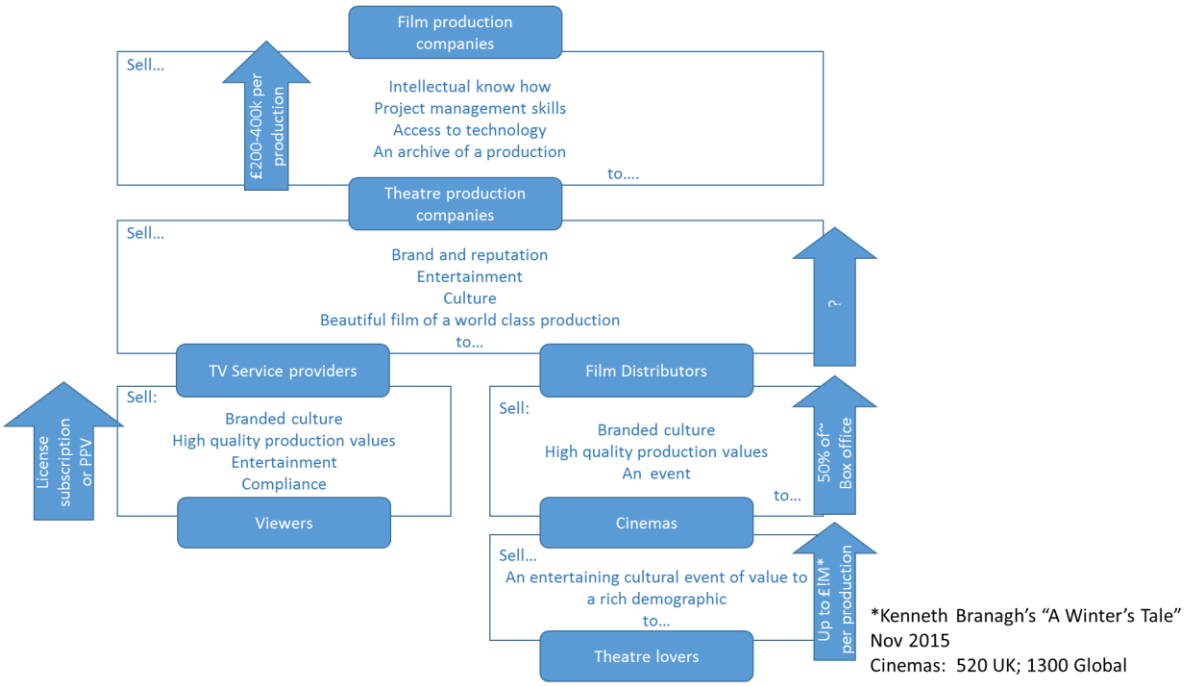


Figure 17 Value chain for the distribution of live theatre to cinemas and homes.

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.

9.2 Watching Theatre at Home – Existing services

9.2.1 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.

9.2.2 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.

9.2.3 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.

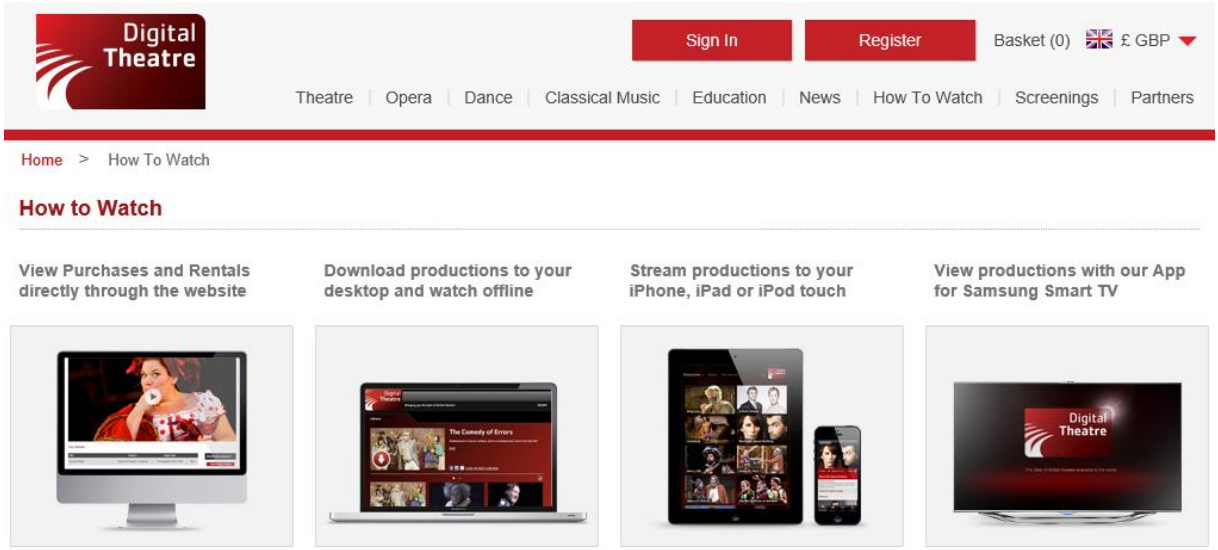


Figure 18 Screen grab of the Digital Theatre web site through which viewers can access an archive of filmed productions of theatre performances on a range of devices.

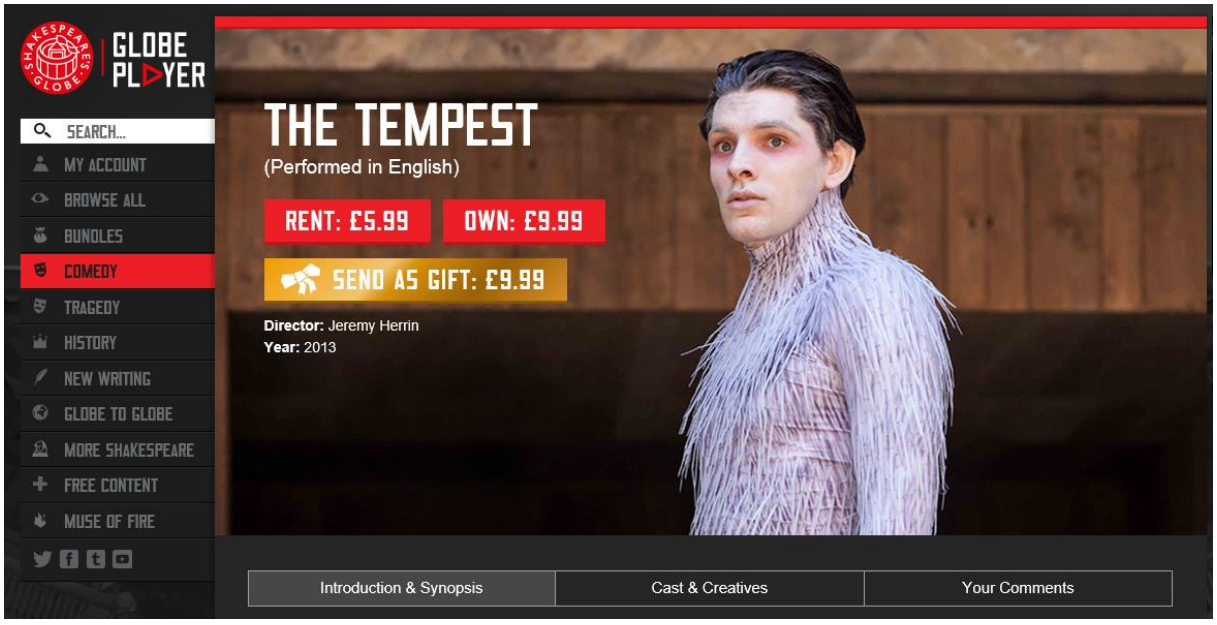


Figure 19 Screen grab of the Globe theatre's "Globe Player" through which filmed productions from the Shakespeare's Globe Theatre on the South Bank of the river Thames in London can be viewed.

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.

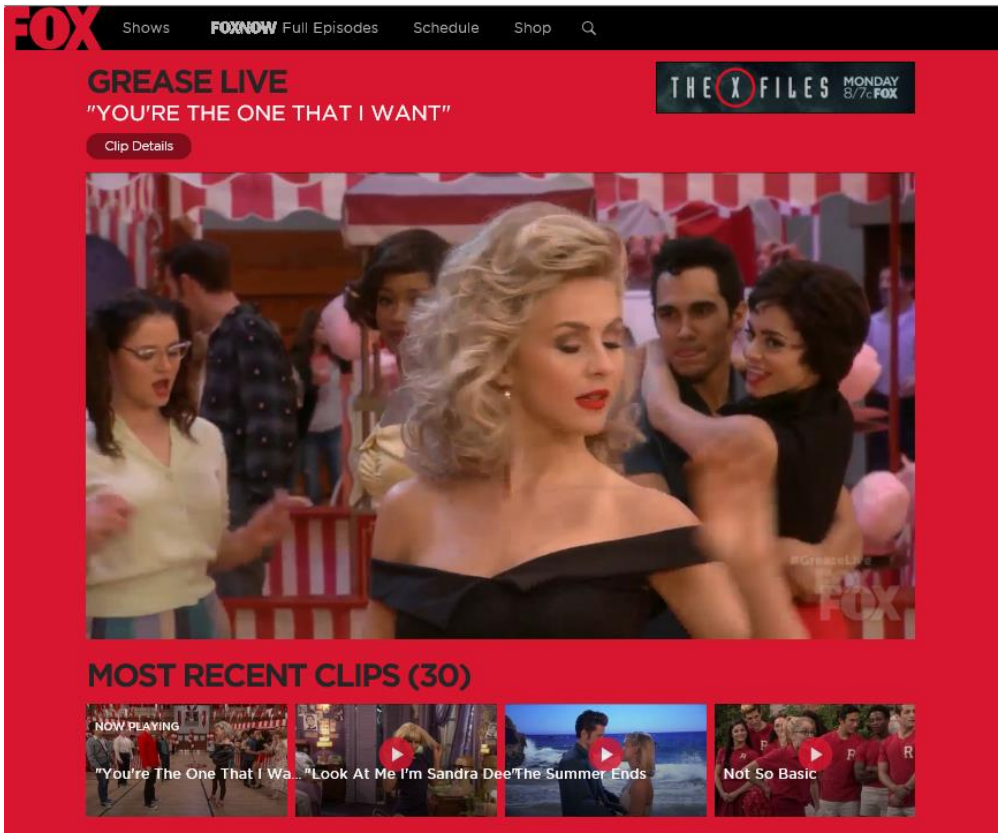


Figure 20 Screen shot from Fox's broadcast of the live musical performance of the musical Grease.

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.

10 Annex 2 – Watching Theatre in School

The content of this Annex was previously published in the original D4.1 deliverable. It is removed from the main body as we felt it interrupted the flow of the description of the original work but is retained as an annex as it is still useful context for the work completed.

10.1 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.

10.2 Watching Theatre in School – Existing services

10.2.1 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.

10.2.2 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.

10.2.3 Current dedicated services for Watching Theatre in School

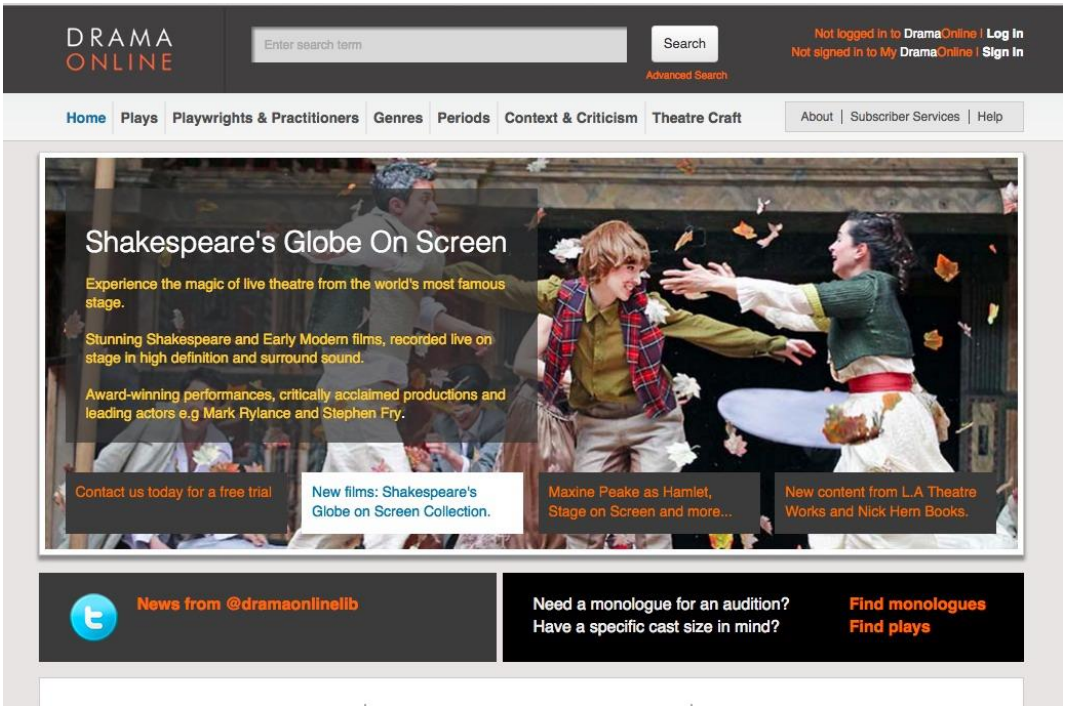


Figure 21 Screen grab from the Drama Online web site that makes recorded productions of live theatre available for Schools.

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 [5] 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.

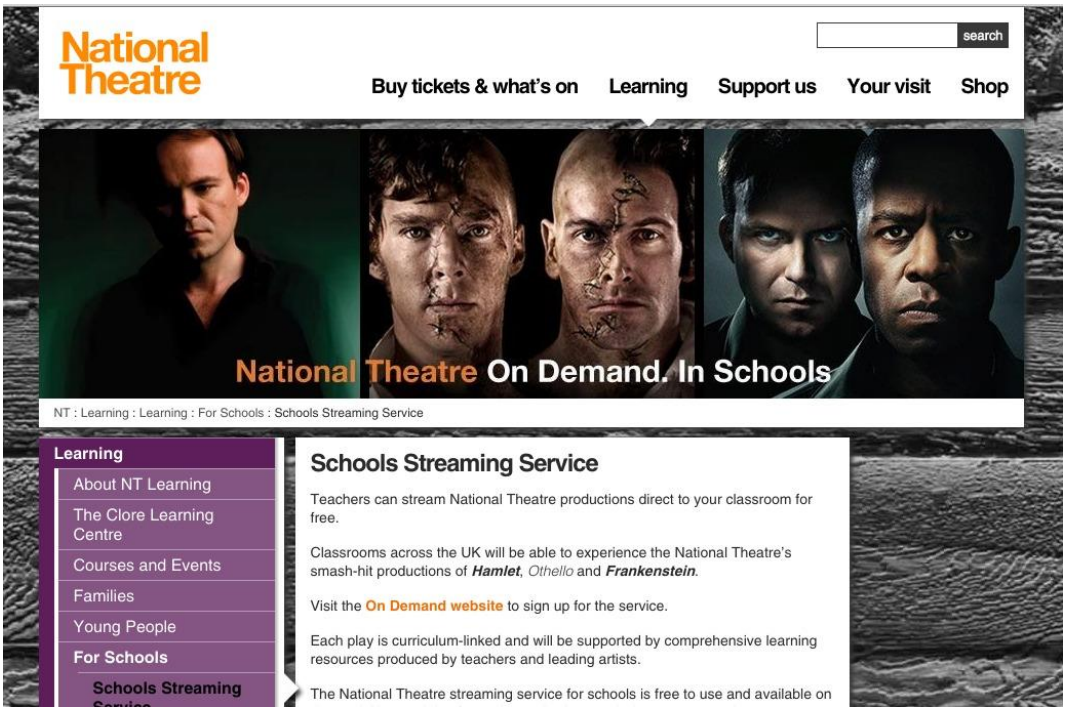


Figure 22 Screen grab from the National Theatre's "On Demand For Schools" service.

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 [6], 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.

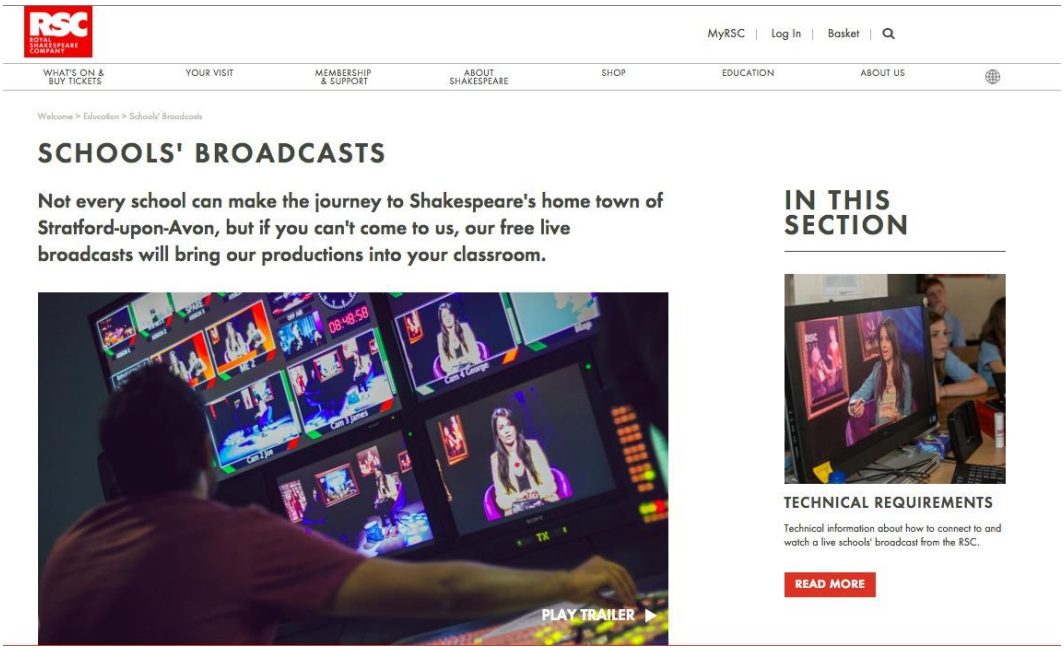


Figure 23 Screen grab from the RSC School's Broadcast web site showing the gallery used to control the live broadcasts to schools.

RSC Education [7] 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

10.3 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.

10.4 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.

10.5 Watching Theatre in School – Social context

Detailing their rationale for their current service, which offers 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.

11 Annex 3 – Watching MotoGP at Home

The content of this Annex was originally included in D4.1. In this update of that deliverable this content is removed from the body of the document as it interrupted the description of the original work. It is retained as an Annex as it remains useful for context.

11.1 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 [2], [3].

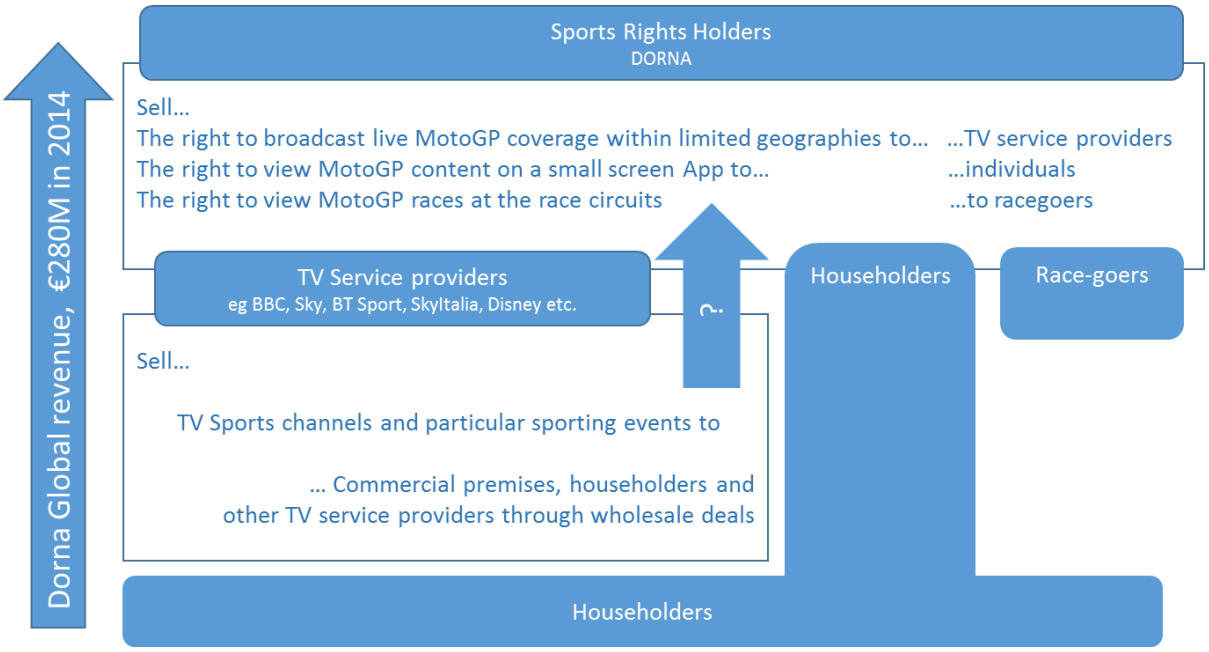


Figure 24 Idealised value chain for TV presentations of MotoGP

11.1.1 Global multi screen coverage

In 2010 MotoGP became the second largest motorsport in the world [4] 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.

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 On-board 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.

11.1.1.1 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.

11.1.1.2 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.

11.1.1.3 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.

11.1.1.4 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.

11.1.1.5 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 2017 MotoGP multiscreen video pass is 170 Euros.

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 [8].

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 [9].

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.

11.2 Watching MotoGP at Home – Existing Services

Motor Sports sell distribution rights of the footage of their races, usually on a per country basis. Whilst Formula 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.

11.2.1 Dorna MotoGP VideoPass App

The MotoGP VideoPass application is the official video app of the MotoGP World Championship for tablets and it features thousands of exclusive, premium videos and provides Live and OnDemand access to hundreds of MotoGP sessions, including all live races with Multiscreen functionality. Dorna sells access direct to consumers independent of any rights sold onto broadcasters. [10].

11.2.1.1 Multi-camera video mosaic

The Multi-screen 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 [10]. The feeds are synchronised and can be viewed simultaneously in a number or preconfigured mosaic layouts.

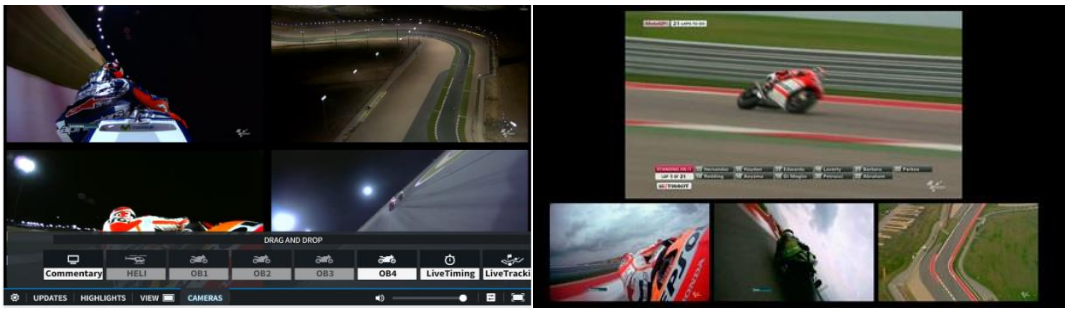


Figure 25 Multiview options available in the MotoGP VideoPass App (2016)

11.2.1.2 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.

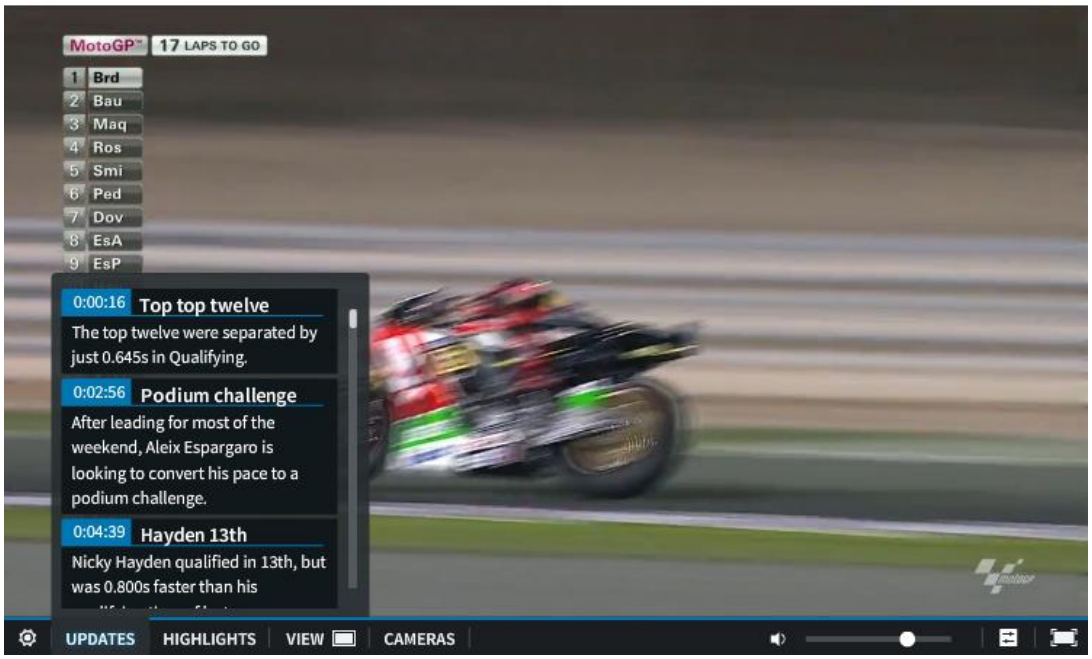


Figure 26 Event text commentary available in the MotoGP VideoPass App (2016)

11.2.1.3 Direct access to highlights

Significant events that occur during a session or race are tagged on a timeline, whether it be the race start, a run off, a crash, an overtake manoeuvre or a penalty. While viewing the live race, viewers can jump back to any moment to replay and then return to live viewing. If viewing after the race all the key moments are provided.

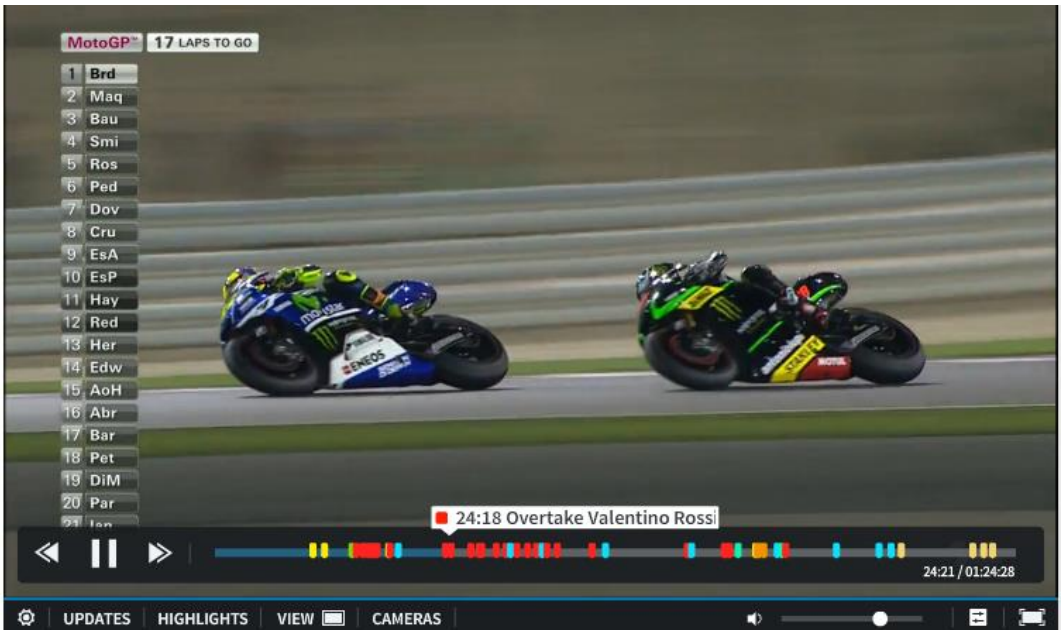


Figure 27 Temporal event markers shown in the MotoGP VideoPass App (2016)

11.2.1.4 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.

11.2.1.5 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.

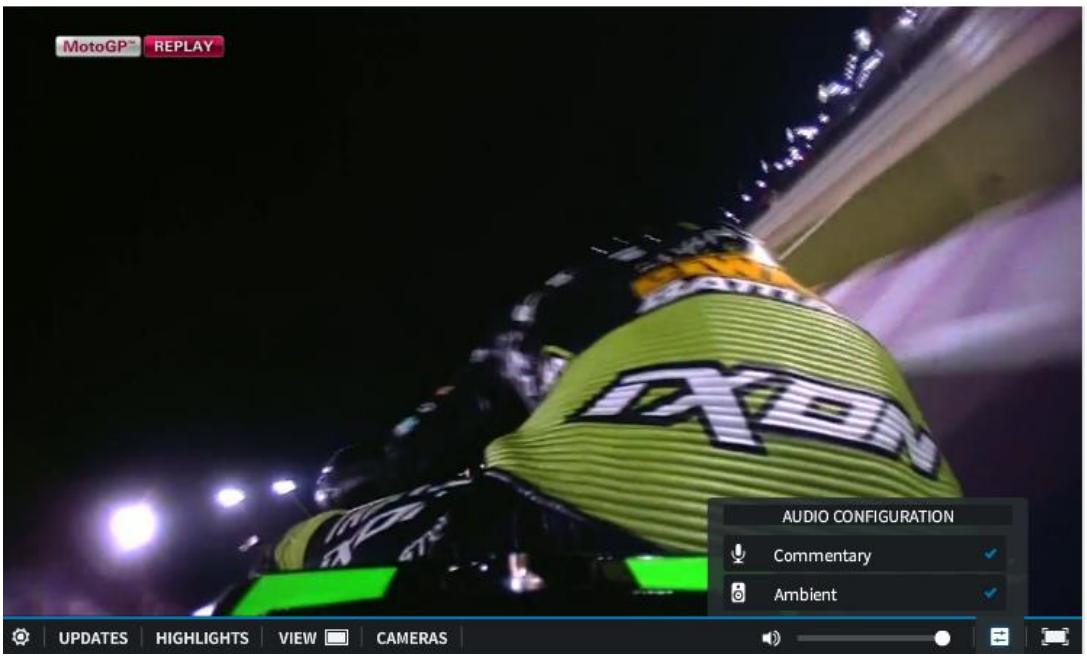


Figure 28 Controls for commentary provided in the MotoGP VideoPass App (2016)

11.2.2 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.

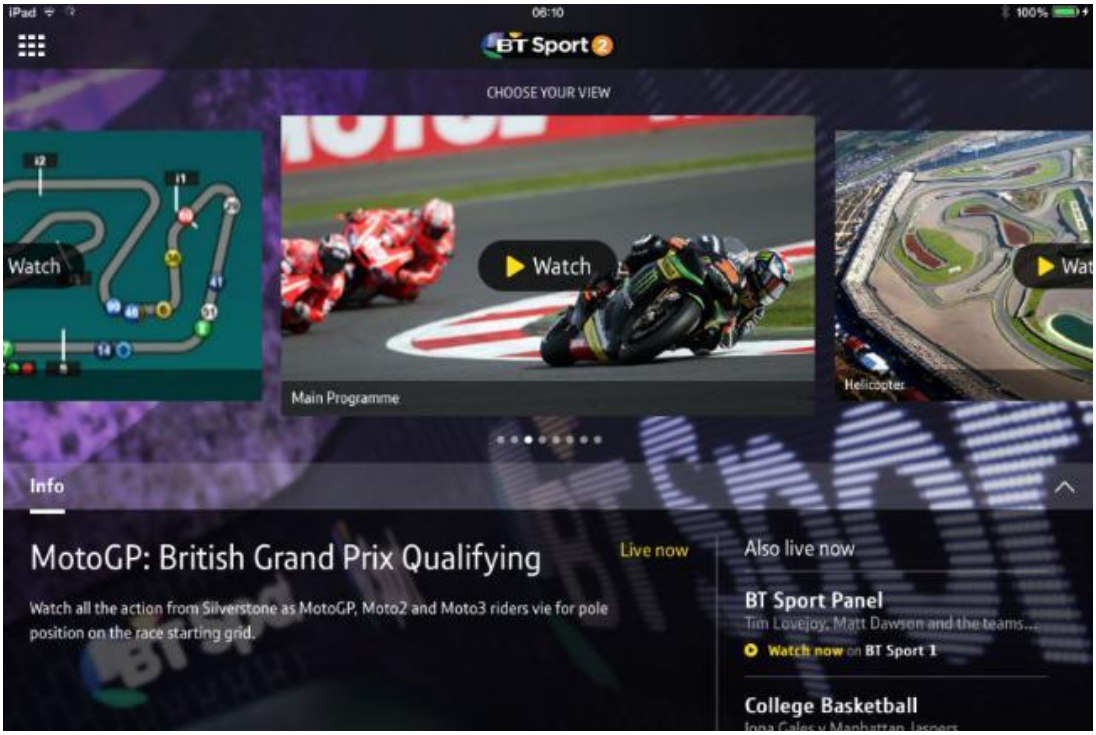


Figure 29 Multi-camera options available in the BT Sport App (2016)

There are eight video feeds for MotoGP which are available during qualifying sessions and races.

- Editorial Race Coverage - International Programme Feed (IPF)
- Helicopter Cam
- Bike Cam 1
- Bike Cam 2
- Bike Cam 3
- Bike Cam 4
- Live Timing – Rider times per sector and full circuit lap.
- Live Tracking – Showing the position of individual riders on a graphical circuit map.

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, the words "Coming Up" are displayed.

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 [11].

11.2.3 Sky Italia MotoGP Mosaic (2015)

An interactive TV service is provided by Sky Italia [12], [13].

In a move designed to improve content discovery among its viewers, Sky Italia 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.

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 30 Sky Italia's multi-camera TV mosaic for MotoGP (2015)

Figure 31 Sky Italia's multi-camera TV mosaic for MotoGP (2015)

Whilst the Dorna, BT Sport and Sky Italia presentations of MotoGP are relevant to consider when developing the requirements for the MotoGP multi-screen use case, inspiration may also be drawn from similar Apps for track sports. An overview of Apps for F1, Nascar and Indy car racing that have been considered can be found in the Annex.

11.2.4 Mintel survey data on Motor Sports

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

	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

11.2.5 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.

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

11.2.6 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.

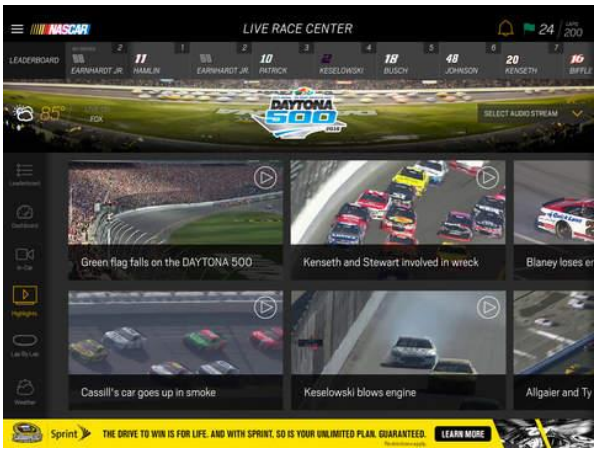
RaceView Premium puts the viewer in complete control for every NASCAR Sprint Cup race. With 3-D rendered virtual video featuring multiple views and camera angles, the viewer can follow live race data and customise which drivers to watch. The viewer can listen to live in-car audio for all 43 Sprint Cup 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.

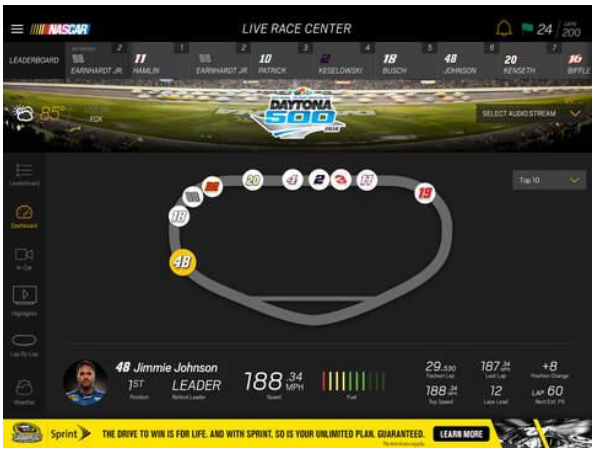
Features:

- 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

11.2.7 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.





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

11.2.8 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.

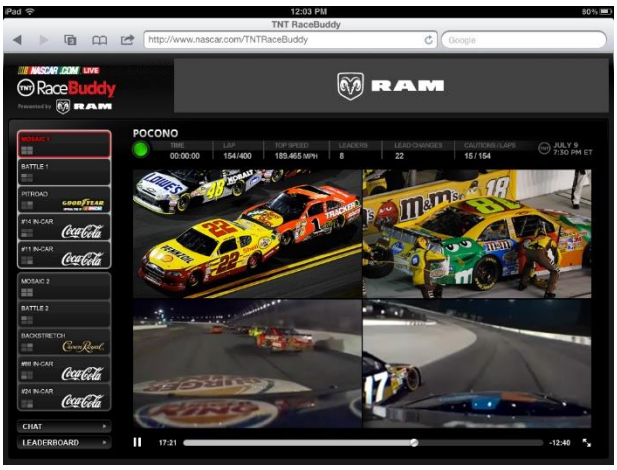
While there are some similarities between NASCAR Drive and RaceBuddy, there are many new features that have been added to NASCAR Drive that were not previously available with RaceBuddy.

Shared Features:

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

New Features:

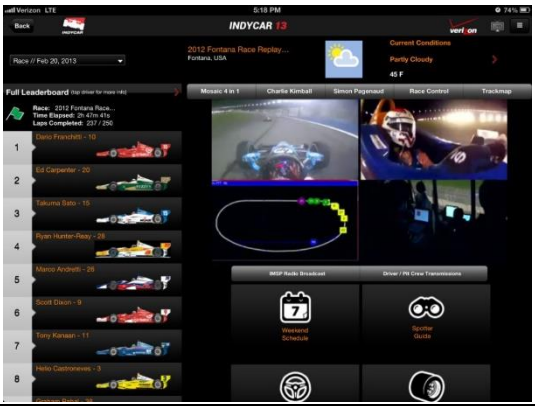
- Customizable video player
- Lap x Lap comments
- Additional driver stats
- Scanner access on page
- Fantasy Live team management on pages
- Drivers' social media feeds



More details can be found here: http://www.nascar.com/racebuddy.html

11.2.9 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.



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.

11.3 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 [4].

11.4 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.

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.

11.5 Watching MotoGP at Home – Social context

Motorsports viewing 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 [14].

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 [15] 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.

12 Annex 4 – Watching Football in a Pub

Some of the information in this Annex was originally included in the first version of this deliverable. In this version some of the background information has been removed to the Annex as it interrupted the flow of the description of the original work, but is still felt to be useful context so should not be deleted.

12.1 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).

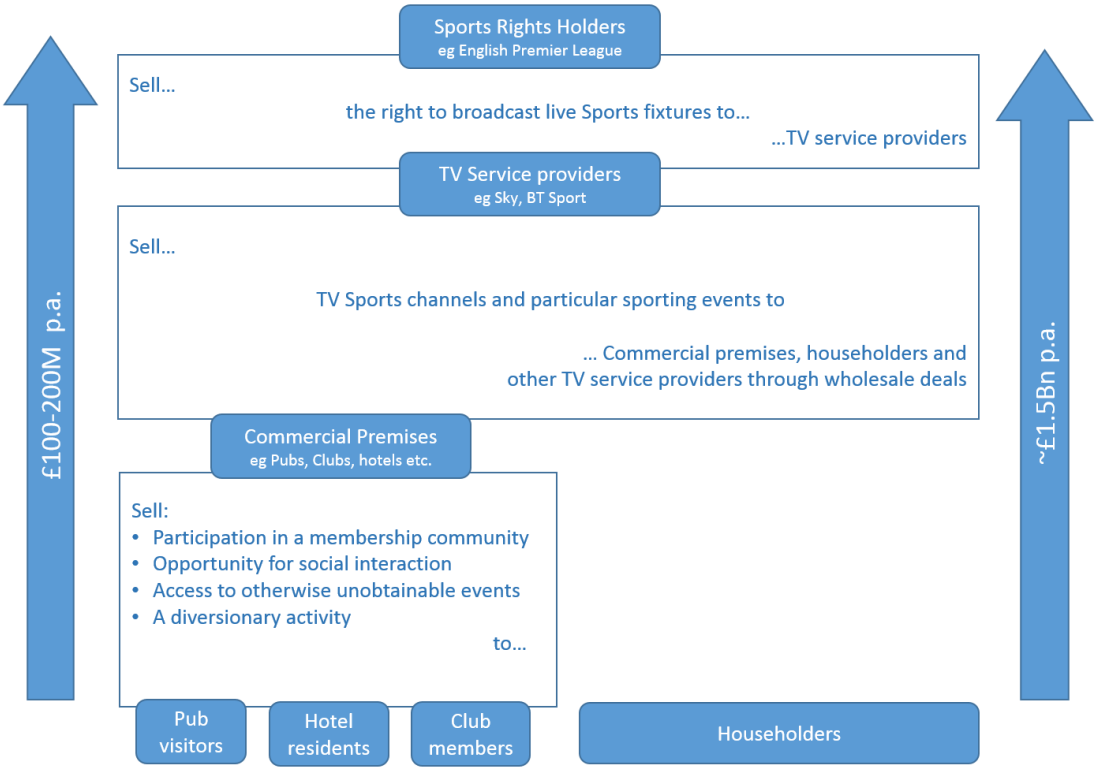


Figure 32 Approximate value chain for the Football in Pubs case.

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.

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.

12.2 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.

12.2.1 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. PayTV was thus an intrinsic part of the rise of the phenomenon of watching TV at a pub.

Figure 33 Punters watching a football match in a UK pub.

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.

12.2.2 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.

12.2.2.1 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)

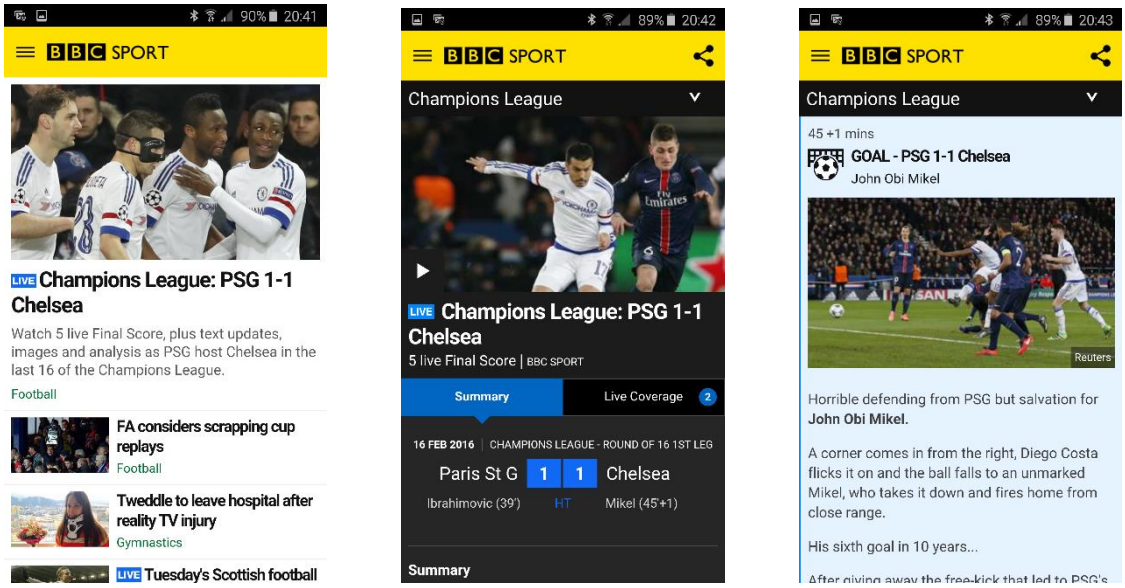


Figure 34 Screen shots of the BBC Sport App

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.

12.2.2.2 My Alerts – Custom Push Notifications

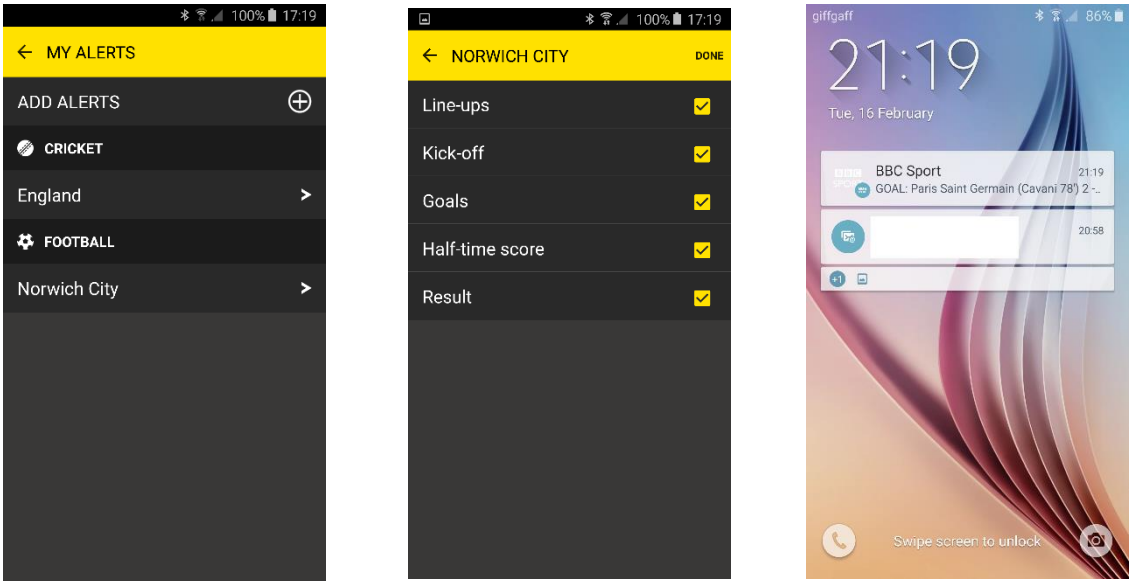


Figure 35 Screen shots showing push notifications on the BBC App.

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.

12.2.2.3 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 where digital rights are held by other parties. In the case of the Premier League these digital rights are separated from the TV broadcast rights.

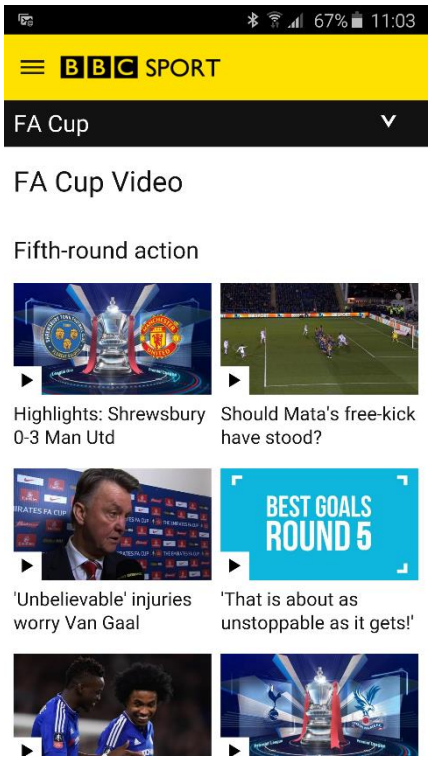


Figure 36 Screen shot of the BBC App showing how goal highlights are displayed (FA Cup only)

12.2.3 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)

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).

12.2.3.1 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 37 Screen shot from the BT Sport App showing the rolling timeline bar being populated with pointers to key events in the match

12.2.3.2 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 38 Screen shot from the BT Sport App showing that the time line icons have associated metadata

12.2.3.3 Multi-Angle Highlights

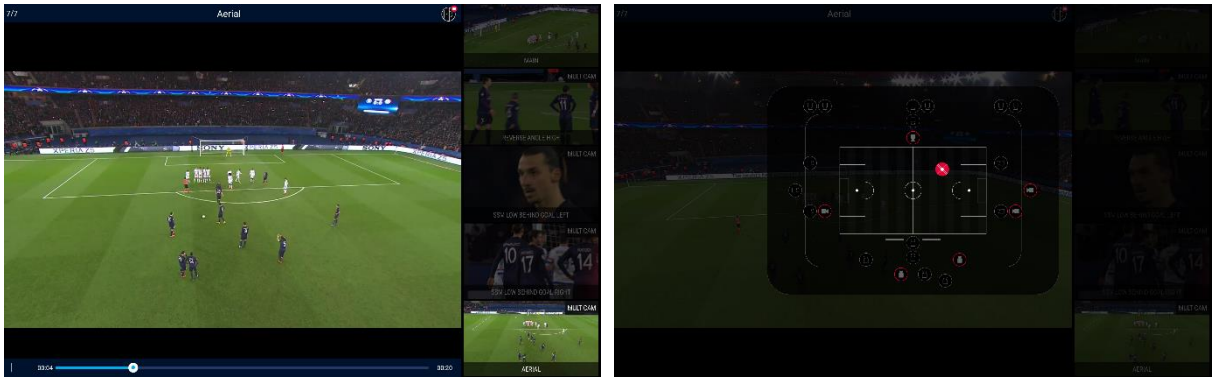


Figure 39 Screen Shot of the BT Sport App showing the behaviour when a multi alternative camera view is selected

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

12.2.3.4 Overlay Match Data

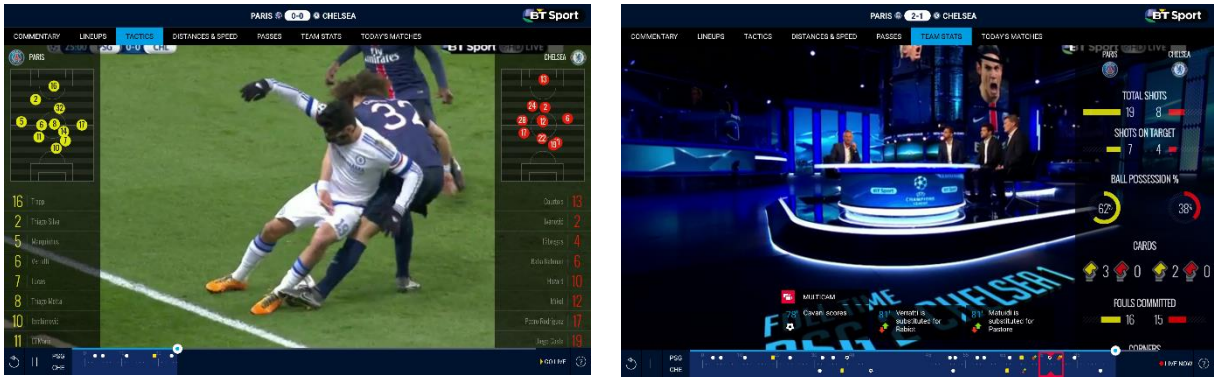


Figure 40 Screen shot from the BT Sport App showing some of the overlay data available

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.

12.2.4 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 41 Photograph of a screen showing adverts for future maps – part of the content managed by the Screech service.

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.

12.3 Watching Football in a Pub – Location

At this stage we have not selected a venue that will be used for the trial but the style of the pub chosen is strongly influenced by The Spectre pub in Cheltenham that was visited on Wednesday January 13th whilst a premier League football match between Liverpool and Arsenal was being shown.

The Spectre pub is owned by Stonegate but is not, as far as I know, 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 busy and 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 relatively young and were "lively", appearing more cheerfully rowdy and playful than the clients in other pubs. 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 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.

The Spectre is not quite a Sports bar in the US sense, but it come close. "Proper" Sports bars are rare in the UK. There have been attempts to introduce them, in particular to City Centres, and the

BarSports Franchise (see images below) is one such example., Carlsberg Sports Bar, JetLag Sports Bar are others…

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).

Figure 42 Montage of Sports Bar images from Bar Sports – a UK Sports Bar franchise.

12.4 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.

12.5 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.

12.6 Watching Football in a Pub – Pub exemplars

The location of the venue for the showcase has yet to be decided. 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 a well founded 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 [16]:

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…)

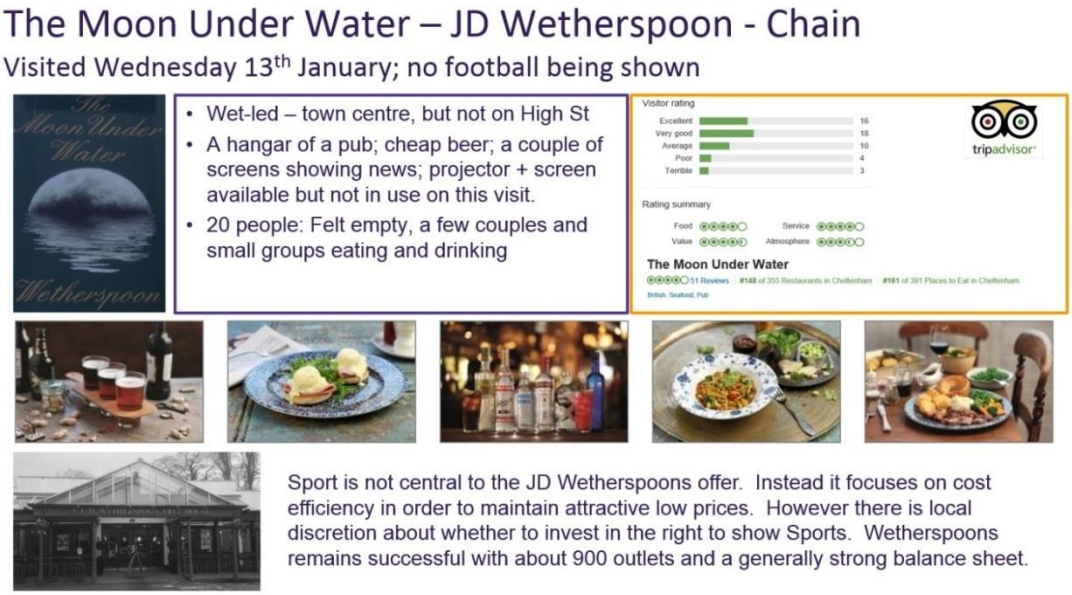


Figure 43 Montage providing a sense of The Moon Under Water Pub in Cheltenham and the way it displays sport

"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. Anywhere 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 44 Montage providing a sense of Tailors Bar in Cheltenham and the way it displays sport.

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.

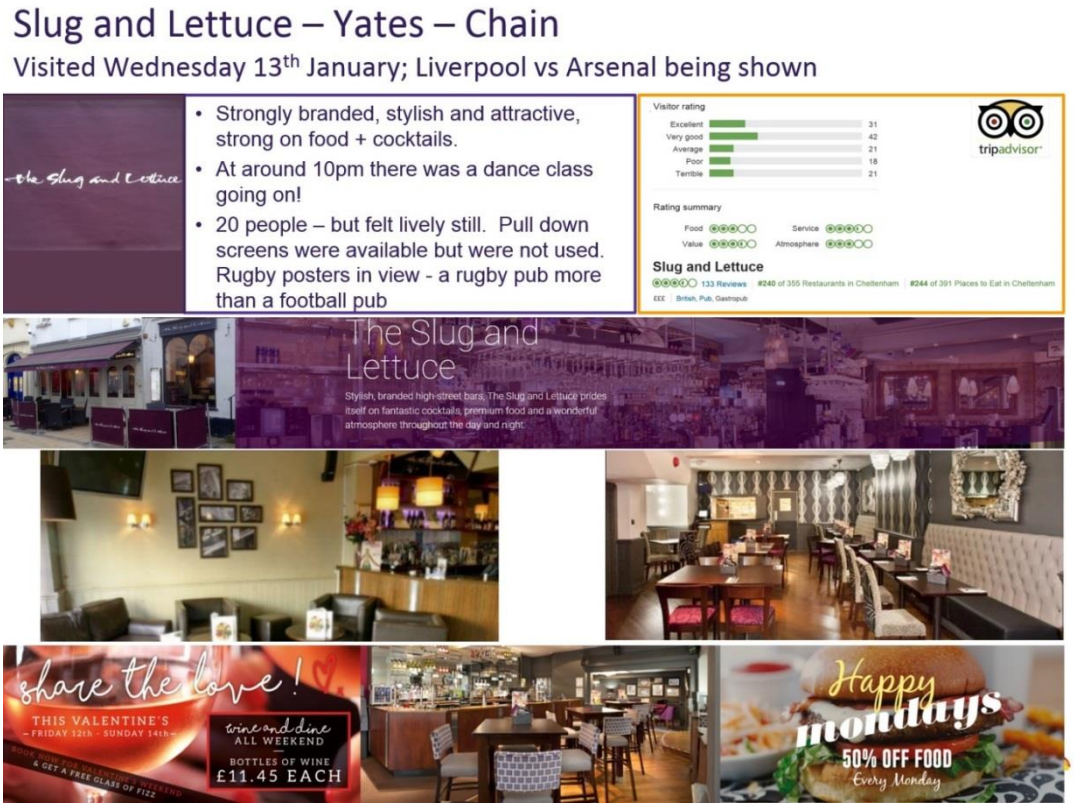


Figure 45 Montage providing a sense of The Slug and Lettuce Bar in Cheltenham and the way it displays sport.

The Spectre (like the Slug and Lettuce) is owned by Stonegate but is not, as far as I know, 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, I suspect, had drunk more and 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 46 Montage providing a sense of The Spectre Pub in Cheltenham and the way it displays sport

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** appears to be the style of pub from which it is sensible to evolve a future live sports multi-screen scenario.