

# MediaScape

Dynamic Media Service Creation,  
Adaptation and Publishing on Every Device

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## WP2 – Design and Specification

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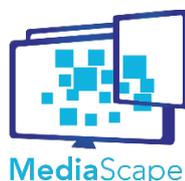
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Project	Document Title	
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## Document Control

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Project	Document Title	
Dynamic Media Service Creation, Adaptation and Publishing on Every Device MediaScape (610404)	D2.1 Usage Scenarios and Requirements	
Version	Date	Author
3.0	09th March 2015	BBC, VIC, IRT, NEC, W3C, NOR, BR

## Table of Contents

<b>1.INTRODUCTION.....</b>	<b>4</b>
<b>2.TERMINOLOGY.....</b>	<b>4</b>
2.1.SCENARIOS.....	4
2.2.USE CASES.....	5
2.3.REQUIREMENTS.....	6
<b>3.PROCESS.....</b>	<b>7</b>
3.1.WORKSHOPS.....	7
<b>4.ANALYSIS OF SELECTED SCENARIOS ACROSS MAIN MEDIASCAPE ACTORS.....</b>	<b>12</b>
4.1.SCENARIO 1: EXTRAMEDIA.....	12
4.2.SCENARIO 2: MULTIQUIZ.....	13
4.3.SCENARIO 3: HYBRIDRADIO.....	14
4.4.SCENARIO 4: SOCIALTV.....	15
4.5.TABLE SUMMARISING THE SCENARIO BENEFITS TO EACH ACTOR.....	15
<b>5.SELECTED SCENARIOS AND USE CASES.....</b>	<b>16</b>
5.1.SCENARIO 1: EXTRAMEDIA.....	16
5.2.SCENARIO 2: MULTIQUIZ.....	19
5.3.SCENARIO 3: HYBRIDRADIO.....	21
5.4.SOCIALTV.....	23
5.5.REQUIREMENTS SUMMARY.....	27
<b>6.CONCLUSIONS.....</b>	<b>28</b>
<b>ANNEX 1: DETAILED PARTNER SCENARIOS.....</b>	<b>29</b>
6.1.43-ALL: COMMUTING QUIZ SHOW.....	29
6.2.36-IRT: DEVICE PAIRING / SURROUNDING RADIO AT HOME.....	29
6.3.42-ALL: MARAUDERS GLASTONBURY MAP.....	30
6.4.3-NOR ISRAELI EUROVISION NIGHT.....	31
6.5.8-W3C DEBATE NEWSPAPER.....	32
6.6.9-W3C VIDEO CALL.....	33
6.7.13-VIC CUSTOM EXTRA MEDIA.....	33
6.8.30-BR THE QUESTION.....	34
6.9.41-ALL CONCERT UPLOAD UGC.....	34



Project	Document Title	
Dynamic Media Service Creation, Adaptation and Publishing on Every Device MediaScape (610404)	D2.1 Usage Scenarios and Requirements	
Version	Date	Author
3.0	09th March 2015	BBC, VIC, IRT, NEC, W3C, NOR, BR

6.10.2-NOR MODULARISED CONSTRUCTION.....	36
6.11.10-W3C CONCERT VIDEO WALL.....	37
6.12.27-BBC PUBLIC SCREEN KNOW MORE ON MOBILE PHONE.....	37
6.13.29-BBC SERIES KEEPING SCORE.....	38
6.14.33-NEC GAME MAP REVIEW.....	38
6.15.35-IRT MULTI-SOURCE GROUP RECOMMENDATIONS / PLAYLIST.....	39
6.16.39-ALL ADVERTISING AS SOCIAL GAMES.....	40
6.17.40-ALL SOCIAL TV EXPERIENCE.....	41
6.18.1-NOR PRODUCING PARTIAL MEDIA.....	41
6.19.4-NOR TRANSFERRING PRESENTATION BETWEEN DEVICES (HIDING TECHNOLOGY).....	42
6.20.6-NOR SWITCHING CONTENT BACKEND (HIDING TECHNOLOGY).....	43
<b>REFERENCES.....</b>	<b>44</b>



Project	Document Title	
Dynamic Media Service Creation, Adaptation and Publishing on Every Device MediaScape (610404)	D2.1 Usage Scenarios and Requirements	
Version	Date	Author
3.0	09th March 2015	BBC, VIC, IRT, NEC, W3C, NOR, BR

## 1. Introduction

This version addresses the specific requirements of this deliverable as specified in the description of work:

"This deliverable will document in detail at least three MediaScape prototype ideas and present the requirements generated from them. In a first step, considering the indications provided by the Advisory Board, usage scenarios for next-generation multi-user connected TV services will be produced. Three of these scenarios will be selected and broken up into use cases (Task 2.1). Based on these, system and application requirements will be derived. In parallel, end user and service requirements based on the selected scenarios will be gathered."

The goals of this task were to:

- Ground the technical choices we make by situating them in real-world scenarios
- Come to a collective agreement about the relative importance of different user scenarios
- Analyse the selected scenarios in order to produce requirements for the architecture tasks and technical work packages

We have:

- Created scenarios of interest per partner
- Collaborated on creating more scenarios together
- Decided together which scenarios to pursue further
- Created step-by-step use cases from four selected scenarios as input to requirements
- Derived high-level requirements from the use cases

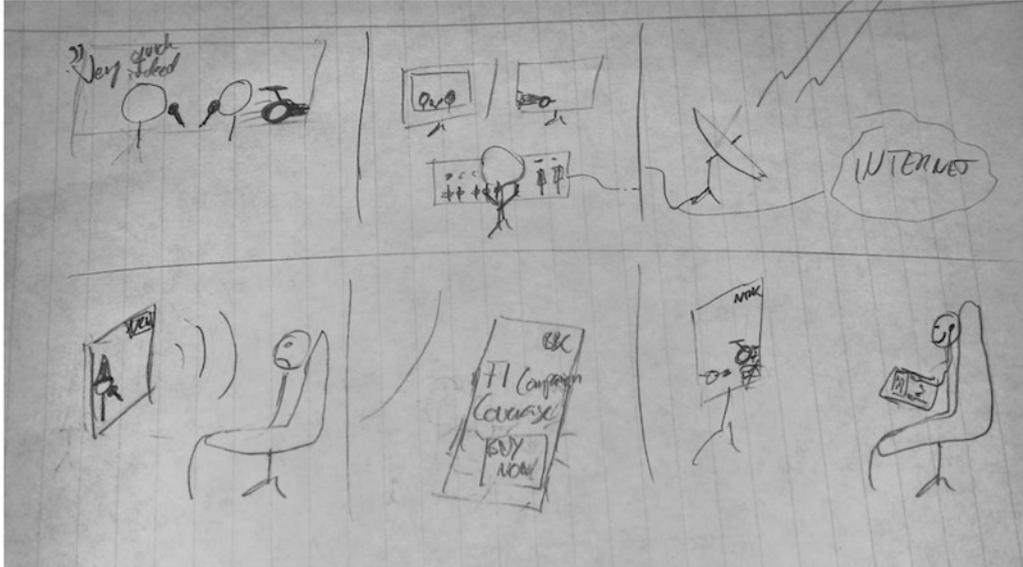
Annex 1, which describes the initial 20 scenarios as selected by the partners, does not need to be read to get an understanding of the work, but is there for reference.

## 2. Terminology

### 2.1. Scenarios

**Scenarios** are realistic descriptions of how the technology will be used by end users. Their purpose is to situate the technology in the context of real user needs. Here is an example in pictorial form, accompanied by a textual description:

#### 2.1.1. Example of scenario description



"Peter is watching a show from the national broadcaster while commuting. As the train nears the station he pauses. He is quite eager to see the end of the show though, so as soon as he enters home he wants to resume it. The broadcaster's app on the smart TV has his personal list of shows on the front page, with the most recent one on top. Peter simply presses the resume button, forgetting that "So you think you can dance" is about to start. There's an outcry as his daughter realises someone is blocking her plan to watch it. Peter submissively opens the show on his laptop too. For a brief moment the show is presented in tight synchrony by the TV and the laptop. At this point Peter can safely vacate the smart TV."

## 2.2. Use Cases

**Use Cases** are step by step descriptions of how the people use the technology and how the technology responds. We are switching from thinking creatively from the point of view of the end user to a more analytical view of what actually happens. We have taken the W3C Web and TV media API use cases [1] as examples of best practice. Here is an example of the scenario above written as a use case, in this sense of the word.

### 2.2.1. Example

Prerequisites:

- User is on a train watching TV on their mobile phone
- The phone receives and plays live video over IP

Steps:

1. User watches a television show on his mobile phone while traveling on the train
2. He pauses the show on his phone when getting off the train, and walks home
3. He turns on his TV when home and current show is suggested on top
4. He selects 'continue current show'
5. His wife arrives home, and demands to use the TV set
6. User turns on his tablet
7. The show is visible in notifications on the tablet
8. User clicks on the notification
9. The show immediately starts playing because he didn't pause it



Project		Document Title
Dynamic Media Service Creation, Adaptation and Publishing on Every Device MediaScape (610404)		D2.1 Usage Scenarios and Requirements
Version	Date	Author
3.0	09th March 2015	BBC, VIC, IRT, NEC, W3C, NOR, BR

10. User vacates the TV and completes watching the show on his tablet in another room

## 2.3. Requirements

**Requirements** in the sense we are currently interested in are statements of the form:

"use case actor X [must|should|can] have behaviour Y under conditions Z"

*without* specifying how the requirement should be implemented. For example, in this case some of the requirements might be:

### 2.3.1. Examples

- MediaScape connected devices must be able to resume media playback regardless of the network they are on
- Connection between devices must be persistent
- Devices should give appropriate notifications for available actions

## 3. Process

### 3.1. Workshops

The goals were:

- To ensure each partner's ideas were heard and understood within the group
- To work directly together in small groups
- To narrow the number of scenarios to a manageable number
- To analyse the resulting scenarios



#### 3.1.1. Goal: Ensure each partner's ideas were heard and understood within the group

We held a workshop in London in December 2013 with BBC, BR and IRT in order to refine the process we were using. We held another workshop with all partners at the face to face meeting in Heidelberg the following week. Before the face to face meeting we asked each partner to provide 3-5 scenarios they were interested in, in the form of storyboards. The purpose of this was to document all aspects of the project that were of interest, from all partners, and from a user perspective rather than a technology perspective. Everyone had an opportunity to talk about the scenarios that interested them at the meeting.

#### 3.1.2. Goal: Work directly together in small groups

Before the meeting, BBC went through all the scenarios provided by the partners and pulled out some salient aspects:

Content/context	People/audience	User need(s) & benefit(s)	Activity(s)
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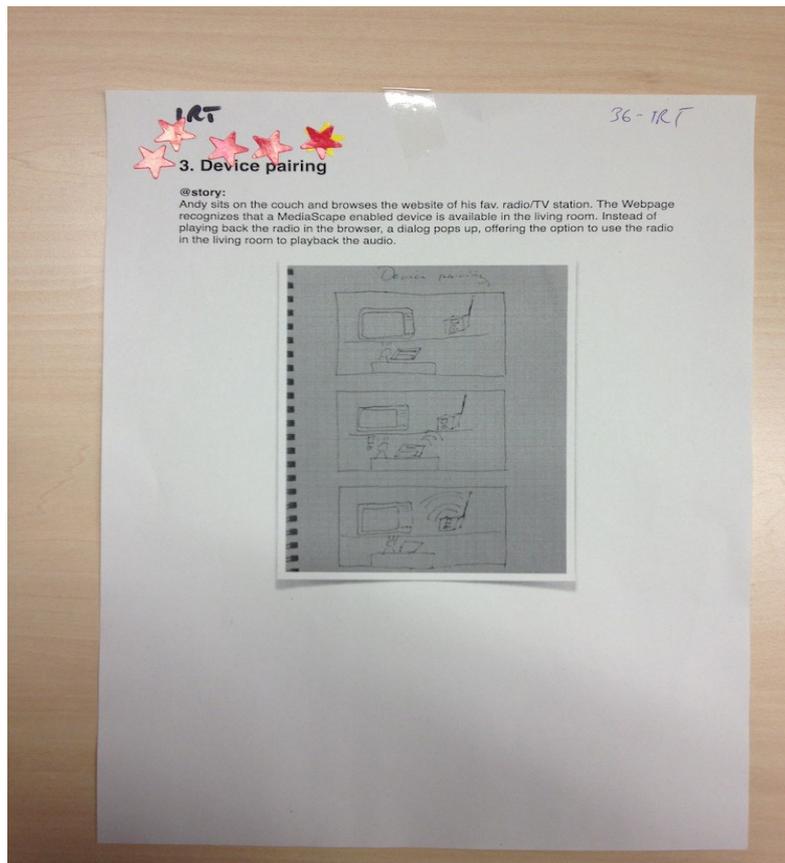
For the scenario above these would be:

Content/context	People/audience	User need(s) & benefit(s)	Activity(s)
Favourite Programme	Commuter / Home viewer	To complete a programme across different devices	Watch on one device Resume on other device(s)

We then summarised these on cards, mixed the cards up, and asked everyone to divide into groups of three or four people who did not already work together.

Each of those smaller groups collected one of each type of card at random and then worked together to create a new scenario that fitted the cards they had chosen. Mid-way through the discussions we returned to the main group to present the ideas the cards had triggered; everyone then returned to their small groups to refine their idea. The end result was a new set of scenarios to add to the existing ones.

The goal of this process was to work together to understand each others' goals, ideas and interests, and to work together. The randomised cards based on deconstructed real scenarios ensured that it was easy to generate new scenarios.



### 3.1.3. Goal: Narrow the number of scenarios to a manageable number – part 1



Project		Document Title
Dynamic Media Service Creation, Adaptation and Publishing on Every Device MediaScape (610404)		D2.1 Usage Scenarios and Requirements
Version	Date	Author
3.0	09th March 2015	BBC, VIC, IRT, NEC, W3C, NOR, BR

We then used a standard voting process to narrow down the scenarios. Each individual had five stars and could vote for whichever existing or new scenarios they liked, including adding all their stars to one scenario.

A brief description of each of the scenarios which received any votes is tabulated below. The name is an identifier consisting of a number and the originating partner - "ALL" indicates that they were the output of the face to face workshop.

Name	Summary	Votes
43-ALL: Commuting quiz show	A man is on the bus, participating in the quiz with friends while watching a gameshow. When he gets home, his smart TV gives him the option to continue to watch the show and continue to play the quiz.	6
36-IRT: Surrounding radio at home	Andy browses to his favourite radio station's web page, which detects his nearby physical radio device and allows him to play the live show through it.	5
42-ALL: Marauders Glastonbury Map	While at the Glastonbury music festival, friends can see each others' locations and collaboratively decide which bands to see, with contextual information about which stages are busy and what's on. Accelerometers allow armchair participants to see where the best bits are.	5
3-NOR Israeli Eurovision Night	Beatrix and friends create their own Eurovision night with a shared selection of songs they do Karaoke to, upload, share as a programme with a live custom voiceover, vote on, and share more widely.	3
8-W3C Debate Newspaper	While watching a political debate on TV, Alex's phone notifies him that his favourite newspaper offers live commentary and statistics on the debate, as an overlay on his TV.	3
9-W3C Video Call	Stephanie is in a video call on her phone with her father, while her son watches TV. She switches the phone's display to the TV so that her son can see and hear his grandfather and vice versa; the TV pauses while the call takes place.	3
13-VIC Custom Extra Media	Two people are watching TV together. They're interested in finding out more about the programme – about a particular plot point. Both can see and extended service on their devices. One continues with the extended information and the other goes to an on-demand programme because he's lost the thread of what's happening in the main story.	3
41-ALL Concert upload UGC	Jo and her friends participate in a singing contest which they found by capturing a link from an advert for a live show. They upload their versions of songs to a site. They watch the live show by a singer, vote on what the singer sings next, and the best participant sings live from home with the band in the interval.	3
2-NOR Modularised Construction	Covering a high stakes Chess match, the producer is provided with a number of different visualizations. They can all be controlled by shared timing information, and can as such be "dragged and dropped" into a web page with no interaction or "glue" between the visualizations and can be personalised to different groups.	2



Project	Document Title	
Dynamic Media Service Creation, Adaptation and Publishing on Every Device MediaScape (610404)	D2.1 Usage Scenarios and Requirements	
Version	Date	Author
3.0	09th March 2015	BBC, VIC, IRT, NEC, W3C, NOR, BR

10-W3C Concert Video Wall	At a concert, the audience takes pictures of the band on stage. When they've taken the picture, it appears on the giant screen at the back of the stage making the audience feel part of the show.	2
27-BBC Public Screen Know More on Mobile Phone	Charlie arrives at the train station after work. He sees a news clip on the big screen and wants to know more. He connects his phone to the big screen. He needs to catch his train, but he can see more about the story on the train.	2
29-BBC Series Keeping Score	Eddie and Frank love the 'Great British Bake Off' TV programme. Every year they each pick a winner in the first episode. This year, Eddie is team Jon, and Frank is team Tom. Each week they pick a winner too, especially if someone is having a good day.	2
33-NEC Game Map Review	Eve and Mark find useful information about a game by moving their phones near an advert for it, including the location of shops that sell it, plus online reviews. The results are fed back to a server which uses the data to improve the experience for others.	2
35-IRT Multi-source Group Recommendations / Playlist	Andy and Christine are suggested an evening's viewing from live and on-demand content by their TV, which remembers their preferences and can request group recommendations from an online service; their TV and can also be controlled by a connected device.	2
39-ALL Advertising as Social Games	While watching a boring show, Sarah gets asked to join a different channel, where there's a competition to spot how many animals appear in the ad break. She joins the show with her friends and they compete to see how spots the most. At the end she gets her score and some statistics for the game.	2
40-ALL Social TV Experience	A user can see what his friends are watching – both for on-demand content (so he can watch out for spoilers / have something to talk about at work) and for live content (so he can join and chat).	2
1-NOR Producing Partial Media	BBC offers audio commentary for F1 production. They may sell this as a standalone product even if they do not have the rights to broadcasting the video content. Foreign broadcasters with such rights may want to buy BBC's live audio commentary - because it's good - as can individual viewers across the world.	2
4-NOR Transferring Presentation Between Devices	Peter is watching TV on his phone while commuting, pauses it as he leaves the train, resumes at home on the TV, then transfers it to a laptop when he gets kicked off the TV by his daughter.	1
6-NOR Switching Content Backend	Anne is watching a comedy show live over DVB-T. She pauses the stream to go make herself a coffee. Anne resumes playback, which is fetched over the Internet from a live-window. She has to pause again to drive her son Anthony to soccer practice. When she comes back home, she again resumes the show. This is now fetched from the catch-up TV service, but she still does not notice any difference.	1

### 3.1.4. Goal: Narrow the number of scenarios to a manageable number – part 2

At this stage we had 20 scenarios, which contained overlapping use cases. Each partner was then asked to go back to consult their organisation, and return a list of their 3 preferred scenarios and state the reasons why they were interested in them – that is, the particular technical or other aspects of the scenario of interest to their organisation. This process enabled VIC to identify where aspects of the scenarios overlapped in a way that was interesting to partners, and to thereby merge several scenarios together.

This was the result of that vote:

Scenario	VIC	IRT	NEC	BBC	NOR	W3C	BR	Total
Merged Extra Media (8-W3C ,13-VIC,1-NOR)	1		1	1	1	1	1	6
Merged MultiQuiz (43-ALL, 29-BBC, 4-NOR)	1	1			1	1	1	5
36-IRT Surrounding Radio at Home		1		1	1	1		4
40-ALL Social TV Experience	1			1			1	3
42-ALL Marauders Glastonbury Map		1						1
35-IRT Multi-source Group Recommendations / Playlist			1					1
NEC Multi-device assisted shopping (new)			1					1
<b>Total</b>	<b>3</b>							

There were four scenarios or combined scenarios with more than one vote, and these were taken as the basis of the next stage.

### 3.1.5. Goal: Analyse the resulting scenarios

The four partners most closely associated with each of the top four scenarios were assigned the task of creating detailed use cases from them. These are described in section 5, along with the derived requirements. In the next section, added after the first review, we contextualise and analyse the four scenarios in terms of the main actors: end-users, developers, broadcasters and other businesses.



Project		Document Title
Dynamic Media Service Creation, Adaptation and Publishing on Every Device MediaScape (610404)		D2.1 Usage Scenarios and Requirements
Version	Date	Author
3.0	09th March 2015	BBC, VIC, IRT, NEC, W3C, NOR, BR

## 4. Analysis of selected scenarios across main MediaScape actors

The main actors considered in the MediaScape description of work were end users, developers, broadcasters and other businesses (the main examples here are small and medium-size businesses providing applications or services). Here we analyse the selected scenarios in terms of the benefits to those different groups.

### 4.1. Scenario 1: ExtraMedia

TVE (a Spanish public broadcaster) is preparing to show the F1 race live TV show in Valencia. In addition to the 'standard' TV signal, they are preparing other content to combine with it:

- Two streaming cameras: a fixed camera in the finish line and a camera that always follows Fernando Alonso
- A graph with the map of the track and the exact location of each pilot (since TVE has the GPS location of each one)
- Real-time statistics of the race: time between pilots, speed, gear, etc.

TVE knows that there are a lot of tourists in Spain that would like to follow the race but do not understand Spanish, so TVE buys a pack from BBC which contains the English commentator audio. TVE also knows that several newspapers and Internet webpages will be adding news about the race in real-time, so they provide an API in order to let third parties add extra content to the TV show. The Spanish newspapers "El País" and "Marca" are going to add news, images and videos during the race.

From a user perspective, Ana and Jon, both in Barcelona, are very interested in the race. They have been watching the race from the beginning on TVE while sitting together in the couch. They both have a smartphone. Their smartphones find the service related to the programme so they are able to access all the services described above. Interacting through their smartphone, they can watch the other cameras or the extra information on their personal devices. They also agree how to manage the TV (one has the permissions or both can control it) and they can overlay pieces of the information on the TV or change the main camera.

In the middle of the race their friend Kevin, originally from USA but living in Barcelona, knocks on the door. Ana pauses the TV. After talking for some minutes, Kevin joins them on the couch and they resume watching the race in the same place they were (so they are not watching "live" TV now). Kevin listens to the BBC audio instead of the audio from TVE, through earphones connected to his smartphone, and they all decide to overlay the news from the "Marca" newspaper in the TV since they are adding very interesting information about some recent changes in the Ferrari engine.

#### 4.1.1. Analysis

##### User perspective

The end users are able to personalise their TV watching experience with the elements that interest them most and that make it easy for them to understand and experience what's happening, without losing the ability to watch TV socially.

##### Developer perspective

The developers from "El País", "Marca" and the BBC are able to write applications which interface with TVE's broadcast application without having to learn a specific set of potentially buggy, quirky technologies specific to TVE. Instead, MediaScape-inspired additions to HTML5 enable them to build an application which they can test against the standardisation test suites, and gives them transferable skills that they can use elsewhere.

##### Broadcaster perspective



Project	Document Title	
Dynamic Media Service Creation, Adaptation and Publishing on Every Device MediaScape (610404)	D2.1 Usage Scenarios and Requirements	
Version	Date	Author
3.0	09th March 2015	BBC, VIC, IRT, NEC, W3C, NOR, BR

Research suggests that younger audiences in particular both expect personalised experiences<sup>1</sup>, and this is therefore a way for broadcasters to improve their audience figures for this age group, which in general are declining (e.g. in the US<sup>2</sup> and UK<sup>3</sup>)

F1 is expensive to acquire for broadcasters and so making the most of extra content which is not necessarily broadcast (such as camera angles) makes financial sense.

These technologies have clear accessibility applications as well as the enjoyment-related applications described here, and accessibility and breadth of engagement is an important performance indicator for many public broadcasters.

### Other business perspective

This scenario could implicitly have multiple small development shops involved in the application building (indeed, there are already several well-used statistics applications for F1 available in the iOS App Store and on Google Play). The principal benefits to these small companies are to have (a) a wider pool of developers to undertake application development (because their skills are more widely available, being HTML-based rather than C++ or Java) and (b) to be able to repurpose similar code-bases for different clients, by relying on standardised APIs which are consistent across multiple contracting organisations.

## 4.2. Scenario 2: MultiQuiz

Peter and Eddie are together, and Peter suggests playing a quiz (he finds one on the BBC iPlayer). He touches his phone against the back of Eddie's and transfer the URL (with session info). Peter needs to head home, leaves Eddie and gets on a passing bus, and they start playing. The quiz is both a TV program in a studio, and users can play against each other online. When the bus is getting close to Peter's stop, he pauses the game (both for him and Eddie), and he adds the message – "brb". As Peter enters the house, his phone suggests using the TV for the video part of the quiz. Then resumes the game. Next Friday, they play the next round, continuing with their scores from last time.

### User perspective

From a user perspective this scenario is all about the move to mobile. Across Europe and beyond, the use of mobile phones has increased beyond all expectations, with 73% of internet users watching TV online (more data is here<sup>4</sup>). 25% of all time on mobile phones is spent on social networking sites, and this scenario brings together two of the most popular uses for mobile.

### Developer perspective

From a developer perspective this scenario is about moving from making custom-made solutions to a complex timing problem towards figuring out what they want to make from these kinds of technologies. MediaScape technologies should free them up to think about what they want to make rather than how to do it.

### Broadcaster perspective

Because of the huge move to mobile, established media companies need to think about how they respond to this change or risk losing market share. The quiz is an established way of making non-interactive content more interactive, and this is an extension of that idea away from the big screen and away from the home. As for

<sup>1</sup>[http://downloads.bbc.co.uk/bbctrust/assets/files/pdf/our\\_work/news\\_current\\_affairs/audience\\_research.pdf](http://downloads.bbc.co.uk/bbctrust/assets/files/pdf/our_work/news_current_affairs/audience_research.pdf)

<sup>2</sup><http://www.marketingcharts.com/television/are-young-people-watching-less-tv-24817/>

<sup>3</sup>[http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr14/2014\\_UK\\_CMV.pdf](http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr14/2014_UK_CMV.pdf) (p.8)

<sup>4</sup><http://www.iabeurope.eu/news/4269m-europeans-online-across-28-markets-belgium-bulgaria-uk>



Project	Document Title	
Dynamic Media Service Creation, Adaptation and Publishing on Every Device MediaScape (610404)	D2.1 Usage Scenarios and Requirements	
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developers, the idea is that having this technology available off the shelf is a way to enable all actors to be more creative, by concentrating on what they want to make rather than the technology.

### Other business perspective

From a small business / developer shop perspective this scenario is about moving from custom cloud services for synchronisation, to partially standardised ones, meaning that some of the backend services move towards commoditisation and can therefore be cheaply replaced.

## 4.3. Scenario 3: HybridRadio

Andy sits on the couch and browses the website of his favourite radio and TV programme PULS (Bayerischer Rundfunk) on a laptop, and notices something interesting is on the radio right now. The webpage recognizes that MediaScape-enabled devices are available in the living room and the kitchen. Instead of playing back the radio in the browser, a dialog pops up, offering the option to use any of these radios to playback the audio, so Andy chooses the living room radio and listens to the programme.

Andy gets hungry, so he transfers the audio onto the MediaScape enabled radio in the kitchen via the website using his smart phone. Andy's smartphone rings and the audio automatically pauses while the call happens. After the call takes place, Andy decides to go out, and presses the "keep for later" button on his smartphone, so he can listen to the radio show later.

### User perspective

Radio is an excellent medium for consuming content while doing another activity, indeed 20% of users do so in the UK (bearing in mind that 45% of radio listening is while travelling, this is a high figure<sup>5</sup>). This scenario addresses two specific user concerns: moving around from room to room while listening, and finding content to play from a very broad range of choices using a device with limited controls and limited inbuilt notifications ability. This transfers the controls of the radio to a device which is much easier to search using, and enables fine-grained transfer of the location of the audio.

### Developer perspective

There is huge potential here for developers to create interesting and innovative applications that work across devices and between them. The importance of the scenario from the developer perspective is to highlight the current limitations of devices and suggest directions in which they could be more useful engaging.

### Broadcaster perspective

The main benefits here are repurposing and reuse of existing content, including on-demand content by making it easier to find and play on the stand-alone devices that people enjoy listening on.

### Other business perspective

This scenario is really about enabling new content models by offering more organisations easy access to home audio players. Currently many high-end hybrid radios solve the problem of search by providing their own portal, so for small content owners, surfacing their content in these walled gardens can be difficult.

There is potential for new forms of content in this area (for example with split images and audio), and also the potential for adaptable content for better audio players.

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<sup>5</sup>[http://stakeholders.ofcom.gov.uk/binaries/research/cmr/cmr14/2014\\_UK\\_CMV.pdf](http://stakeholders.ofcom.gov.uk/binaries/research/cmr/cmr14/2014_UK_CMV.pdf) section 1.5.14



Project		Document Title
Dynamic Media Service Creation, Adaptation and Publishing on Every Device MediaScape (610404)		D2.1 Usage Scenarios and Requirements
Version	Date	Author
3.0	09th March 2015	BBC, VIC, IRT, NEC, W3C, NOR, BR

#### 4.4. Scenario 4: SocialTV

James is sitting at home watching the TV programme Breaking Bad. His second screen device shows that Alex is on episode 10, Bob is on episode 11, whereas he's on episode 9. So he watches two episodes so he can talk later about it at work. The next day, he sees a notification that Jo and Sara are watching a quiz together, so he joins in and watches and plays with them. The next day he doesn't know what to watch. He gets a notification on his TV that Jo and Sara are watching a live political discussion programme. He joins the programme. On a second screen device he can see the latest comments from Jo and Sara. He can watch and comment and talk with Jo and Sara.

##### User perspective

This is about enjoying media-related downtime with friends even when - as increasingly is the case - those friends are not physically present. TV is increasingly fragmented across channels and on-demand sources, and this is a way to enable the kinds of conversations around media that form art of society.

##### Developer perspective

Unlike the other scenarios, this is more of a specific "social notifications" application for TV. When such APIs exist (as described in the "Other business perspective" section below) there are more opportunities for interesting application development using a relatively small set of transferable skills, rather than locking themselves into the specific infrastructures of particular manufacturers.

##### Broadcaster perspective

For audiences, second screen devices are very commonly used while watching TV. This scenario is about capturing this attention rather than letting it escape into other media areas, and increasing engagement via social media.

##### Other business perspective

Several TV manufacturers have been attempting to create application ecosystems for their TVs, but uptake has been relatively slow, for two reasons: (a) no-one knows who will win, and without a standard that means application developers may need to write apps for multiple platforms (b) while some applications are suited to a TV screen, many of the kinds of notifications suited to social applications are too private or intrusive to appear on a large screen. This scenario opens up some the possibility of a different kind of application ecosystem.

#### 4.5. Table summarising the scenario benefits to each actor

Scenario	End user	Developer	Broadcaster	Other business
1. ExtraMedia	Personalisation	Standards, testable code, transferable skills	Reach, accessibility, repurposing of content	Wider developer pool, repurposable code and skills
2. MultiQuiz	Mobile and social	Creativity	Maintaining market share	Cost reduction
3. HybridRadio	Personalisation and control	Innovation	Repurposing and reuse of content	New forms of content
4. SocialTV	Experiences and choice for distributed groups	Transferable skills	Attention capture	Standards-based new application ecosystem



Project		Document Title
Dynamic Media Service Creation, Adaptation and Publishing on Every Device MediaScape (610404)		D2.1 Usage Scenarios and Requirements
Version	Date	Author
3.0	09th March 2015	BBC, VIC, IRT, NEC, W3C, NOR, BR

## 5. Selected Scenarios and Use Cases

Below are the detailed use cases derived from the modified scenarios.

### 5.1. Scenario 1: ExtraMedia

TVE (a Spanish public broadcaster) is preparing to show the F1 race live TV show in Valencia. In addition to the 'standard' TV signal, they are preparing other content to combine with it:

- Two streaming cameras: a fixed camera in the finish line and a camera that always follows Fernando Alonso
- A graph with the map of the track and the exact location of each pilot (since TVE has the GPS location of each one)
- Real-time statistics of the race: time between pilots, speed, gear, etc.

TVE knows that there are a lot of tourists in Spain that would like to follow the race but do not understand Spanish, so TVE buys a pack from BBC which contains the English commentator audio. TVE also knows that a several newspapers and Internet webpages will be adding news about the race in real-time, so they provide an API in order to let third parties add extra content to the TV show. The Spanish newspapers "El País" and "Marca" are going to add news, images and videos during the race.

From a user perspective, Ana and Jon, both in Barcelona, are very interested in the race. They have been watching the race from the beginning on TVE while sitting together in the couch. They both have a smartphone. Their smartphones find the service related to the programme so they are able to access all the services described above. Interacting through their smartphone, they can watch the other cameras or the extra information on their personal devices. They also agree how to manage the TV (one has the permissions or both can control it) and they can overlay pieces of the information on the TV or change the main camera.

In the middle of the race their friend Kevin, originally from USA but living in Barcelona, knocks on the door. Ana pauses the TV. After talking for some minutes, Kevin joins them on the couch and they resume watching the race in the same place they were (so they are not watching "live" TV now). Kevin listens to the BBC audio instead of the audio from TVE, through earphones connected to his smartphone, and they all decide to overlay the news from the "Marca" newspaper in the TV since they are adding very interesting information about some recent changes in the Ferrari engine.

#### 5.1.1. UC1: Single user with two devices and extra info

##### Prerequisite

- Ana is watching a DVB-T/S TV programme
- This TV programme has a related service
- Ana has already paired her TV and her tablet

##### Use Case

- Ana starts watching the F1 in the TV (live programme)
- Ana gets a notification in the tablet to start a TV related service
- Ana watches in the tablet a circuit map and the real time GPS pilot's position.
- She also watches real-time statistics from her tablet.

##### Requirements

- **Device pairing / association:** the devices are already associated as a prerequisite.



Project	Document Title	
Dynamic Media Service Creation, Adaptation and Publishing on Every Device MediaScape (610404)	D2.1 Usage Scenarios and Requirements	
Version	Date	Author
3.0	09th March 2015	BBC, VIC, IRT, NEC, W3C, NOR, BR

- **Service discovery:** the tablet and the TV need to know that there is a service related to that TV programme.
- **Device notifications:** devices obtaining notifications
- **Timeline based synchronisation:** service information synchronised with the TV programme timeline.

### 5.1.2. UC2: Single user with two devices and content migration

This use case is a continuation of UC1.

#### Prerequisite

- Ana is watching a live TV F1 race
- She has extra information coming from the broadcaster in her tablet

#### Use Case

- Ana selects the relevant information that she is watching on the tablet to send it to the TV: the position of Fernando Alonso and Sebastian Vettel in the map
- Ana sets up the overlay permanently in another corner of the TV using the tablet

#### Requirements

- **Content adaptation and migration:** the content nature and resolution is adapted to show a specific visual layout through the different devices.
- **UI adaptation:** the view layout on each device is always adapted to the Interface of the device.
- **Timeline based synchronisation:** service information is synchronised with the TV programme whether on the tablet or the TV

### 5.1.3. UC3: Broadcast-Internet media synchronisation

This use case is a continuation of UC1 or UC2.

#### Prerequisite

- Ana is watching a live TV F1 race
- She has extra information coming from the broadcaster in her tablet

#### Use Case

- Ana opens the stream of the Fernando Alonso in-car camera on the tablet while continuing watching the TV with the broadcast content.

#### Requirements

- **Media Synchronisation:** videos/audio streams are synchronised

### 5.1.4. UC4: TV and newspaper

This use case is a continuation of UC1 or UC2.

#### Prerequisite

- Ana is watching a live TV F1 race
- She has extra information coming from the broadcaster on her tablet
- TVE (The Spanish broadcaster) has allowed 3rd parties to introduce their services in a loosely coupled way. For example, Marca the sport newspaper is providing media related news and images. The Spanish



Project		Document Title
Dynamic Media Service Creation, Adaptation and Publishing on Every Device MediaScape (610404)		D2.1 Usage Scenarios and Requirements
Version	Date	Author
3.0	09th March 2015	BBC, VIC, IRT, NEC, W3C, NOR, BR

broadcaster does not take care of the quality or accuracy of the content but just opens a window to external services.

### Use Case

- Ana watches the information that the newspaper provides integrated inside the broadcasters service

### Requirements

- **Service discovery:** There is a service related to that TV programme and it knows that there is another service linked
- **Timeline based synchronisation:** the breaking news items are synchronised with the main video stream
- **Injected metadata available**
- **Content adaptation**

#### 5.1.5. UC5: Market Place

This use case is based on UC4 but from a market place/role point of view.

### Prerequisite

- Anna is watching a live TV F1 race
- The content provider has defined roles and has opened it up to 3rd parties to provide content for these roles.
- Anna has her tablet open on the provider's F1 page

### Use Case

- Anna is watching an F1 race on her TV set
- She chooses the "Commentary" menu, and is given several options
- She selects "Commentary by Rubens Barrichello and Pedro Della Rosa, provided by 'F1 stars of the World'"
- The commentary is played on her TV, synchronized with the race.

### Requirements

- **Media synchronisation**
- **Device association:** tablet controls TV experience

#### 5.1.6. UC6: Second user pairing

This use case is a continuation of UC1 or UC2.

### Prerequisite

- Ana is watching a live TV F1 race
- She has extra information coming from the broadcaster on her tablet
- Jon appears in the living room with a smartphone

### Use Case

- Jon associates his smartphone to the TV and the related service
- Jon has access to all the extra information in his smartphone



Project	Document Title	
Dynamic Media Service Creation, Adaptation and Publishing on Every Device MediaScape (610404)	D2.1 Usage Scenarios and Requirements	
Version	Date	Author
3.0	09th March 2015	BBC, VIC, IRT, NEC, W3C, NOR, BR

## Requirements

- **Device pairing / association:** New device associates with the TV and with the service

### 5.1.7. UC7: Pausing and resuming the programme

This use case is a continuation of UC1 or UC2.

#### Prerequisite

- Ana is watching a live TV F1 race
- She has extra information coming from the broadcaster on her tablet

#### Use Case

- Ana decides to pause the TV Programme
- After 10 minutes Ana presses “resume” to continue watching the race from the same place and the related service is synchronised
- After 5 minutes Ana decides to go back to the live programme on the TV and the related service is synchronised

#### Requirements

- **Pause / resume / seek:** pause the broadcasted signal, and resume it in the same place (so on demand). Go back to the broadcasted time-line in the mainstream video and continue to receive all the related services
- **Timeline based synchronisation:** All the related services are always synchronised with the main video

### 5.1.8. UC8: Audio exchange and synchronisation

This use case is a continuation of UC5:

#### Prerequisite

- Ana and Jon are watching a live TV F1 race
- They have extra information on the tablet (Ana) and smartphone (Jon)
- There is an external service from the BBC integrated with the service

#### Use Case

- Jon decides to hear the English audio from BBC in his smartphone and the earphones
- After some minutes, Jon “sends” the audio to the TV to replace the original broadcasted audio
- The TV now shows the broadcasted video and the audio from the BBC

#### Requirements

- **Service discovery:** there is a service related to that TV programme and it knows there is another service linked (BBC’s English audio)
- **Media Synchronisation:** audio from BBC (Internet streaming) and video from TVE (both video streaming and broadcasted signal) are synchronised, first in separate devices and then in the TV together
- **Content adaptation and migration**
- **Session control**

## 5.2. Scenario 2: MultiQuiz

Peter and Eddie are together, and Peter suggests playing a quiz (he finds one on the BBC iPlayer). He touches

his phone against the back of Eddies and transfer the URL (with session info). Peter needs to head home, leaves Eddie and gets on a passing bus, and they start playing. The quiz is both a TV program in a studio, and users can play against each other online. When the bus is getting close to Peter's stop, he pauses the game (both for him and Eddie), and he adds the message – "brb". As Peter enters the house, his phone suggests using the TV for the video part of the quiz. Then resumes the game. Next Friday, they play the next round, continuing with their scores from last time.

### 5.2.1. UC9: Starting a quiz

#### Prerequisite

- Peter and Eddie want to play a quiz show related to a BBC programme
- They both have online smartphones
- There is an interactive quiz available related to a BBC programme

#### Use Case

- Peter looks for an interactive quiz on the iPlayer
- He can invite Eddie via a simple 'magic smartphone touch or bump'
- They play online

#### Requirements

- **Device pairing/association:** Ad-hoc device pairing
- **Timeline based synchronization:** The questions are presented at the same time for both, and their response times are recorded
- **Adding user inputs to the timeline**

### 5.2.2. UC10: Adding a TV to the Quiz

This use case is a continuation of UC9:

#### Prerequisites

- Peter and Eddie are playing a Quiz show on their online smartphones
- Peter is traveling, using audio (to save bandwidth) and voting buttons on his phone
- When he arrives home, he includes the TV in the experience, but later he has to vacate the TV again

#### Use Case

- When arriving home, Peters phone suggests using the TV for the quiz
- Peter accepts and the video component as well as an infographic of the scores is transferred to the TV. His smartphone stops the audio stream, and is left with a graphical user interface to provide the answers.
- After some minutes, Peter has to vacate the TV for Jane, so he moves the quiz to his phone, now showing video as opposed to audio.

#### Requirements

- **Device pairing/association:** Up front, needs to know about locations.
- **Content adaption and migration:** Moving and re-formatting components of the Quiz based on the selected devices. The service decides which information is presented on the TV and which on the phone.



Project	Document Title	
Dynamic Media Service Creation, Adaptation and Publishing on Every Device MediaScape (610404)	D2.1 Usage Scenarios and Requirements	
Version	Date	Author
3.0	09th March 2015	BBC, VIC, IRT, NEC, W3C, NOR, BR

- **Timeline based synchronization:** All devices are kept in sync.

### 5.2.3. UC11: Quiz with a group of friends

This use case is a continuation of UC9:

#### Prerequisite

- Peter and Eddie are playing a quiz show on their online smartphones
- Peter and Eddie have friends, and some of them are also playing this quiz

#### Use Case

- Peter can see which of his friends are also participating in this quiz
- Peter invites some of them to exchange the scores and compete together
- Some of his friends accept and they continue playing the quiz in a larger group

#### Requirements

- **User authentication:** Peter and Eddie are authenticated in the quiz so they can find friends and can be found
- **Social graph:** they have friends and can manage permissions to exchange information about the services with them
- **Timeline based synchronization:** All users are kept in sync.
- **Adding user inputs to the timeline**

## 5.3. Scenario 3: HybridRadio

Andy sits on the couch and browses the website of his favourite radio and TV programme PULS (Bayerischer Rundfunk) on a laptop, and notices something interesting is on the radio right now. The webpage recognizes that MediaScape-enabled devices are available in the living room and the kitchen. Instead of playing back the radio in the browser, a dialog pops up, offering the option to use any of these radios to playback the audio, so Andy chooses the living room radio and listens to the programme.

Andy gets hungry, so he transfers the audio onto the MediaScape enabled radio in the kitchen via the website using his smart phone. Andy's smartphone rings and the audio automatically pauses while the call happens. After the call takes place, Andy decides to go out, and presses the "keep for later" button on his smartphone, so he can listen to the radio show later.

### 5.3.1. UC12: Radio discovery via browser

#### Prerequisite

- Radio station website with MediaScape functionality
- MediaScape enabled radio(s) are connected to the network at home (Wi-Fi, Ethernet)
- Laptop is connected to the same network (Wi-Fi, Ethernet)

#### Use Case

- Andy browses the website of a the Pulse radio station on a PC.
- Andy gets a notification, telling he can use the MediaScape enabled radio to listen to the radio station



Project	Document Title	
Dynamic Media Service Creation, Adaptation and Publishing on Every Device MediaScape (610404)	D2.1 Usage Scenarios and Requirements	
Version	Date	Author
3.0	09th March 2015	BBC, VIC, IRT, NEC, W3C, NOR, BR

- Andy accepts and the MediaScape enabled radio starts to play.

### Requirements

- **Device discovery:** The PC discovers a connected radio
- **Device pairing / association:** There is an association an invocation between devices
- **Device notifications:** Andy receives a notification in the tablet saying that there is a radio available
- **Capability Discovery**

### 5.3.2. UC12B: Radio control from a tablet / smartphone

#### Prerequisite

- Radios connected to a local area network with MediaScape functionality

#### Use Case

- Andy turns on his tablet
- He opens the MediaScape controller app
- The tablet shows him all the MediaScape-enabled devices on his home local area network
- Andy selects the radio in the kitchen, selects a channel and turns up the volume

#### Requirements

- Works without registration - 'Out of the box'
- Works when disconnected from internet

### 5.3.3. UC13: Radio control via browser

This use case is a continuation of UC12:

#### Prerequisite

- Andy is browsing the Pulse radio web page in the PC and listening to the radio
- Andy is able to control the radio via browser (play, pause, resume, etc.)

#### Use Case

- Andy presses "pause" in the PC to pause the radio
- After that, Andy presses "resume" and the radio continues where it was
- Then, Andy presses "live" and the radio goes to the broadcast live programme
- Andy presses "create a bookmark" since what he is hearing is very interesting and he might listen to it again
- After some minutes Andy changes the radio programme to another broadcast channel

#### Requirements

- **Pause / resume / seek**
- **Timeline based synchronisation**
- **Adding user inputs to the timeline**



Project	Document Title	
Dynamic Media Service Creation, Adaptation and Publishing on Every Device MediaScape (610404)	D2.1 Usage Scenarios and Requirements	
Version	Date	Author
3.0	09th March 2015	BBC, VIC, IRT, NEC, W3C, NOR, BR

#### 5.3.4. UC14: Multi-Radio control and context

This use case is a continuation of UC12:

##### Prerequisite

- Andy is browsing the Pulse radio web page in the PC and listening to the radio
- Andy has another connected radio in the kitchen

##### Use Case

- Andy starts playing the audio on the radio device in the kitchen using the PC (while the radio in the living room continues playing)
- Andy changes the controls from the PC to the smartphone

##### Requirements

- **Device discovery:** a new radio in the kitchen is discovered
- **Device pairing / association:** Andy associates and uses now the new radio and the smartphone
- **Content adaption and migration:** Moving and re-formatting components (controls).
- **UI adaptation:** different GUI on the PC and smartphone
- Media Synchronisation

#### 5.3.5. UC15: Radio control from the smartphone

This use case is a continuation of UC14:

##### Prerequisite

- Andy is in the kitchen
- Listening to the connected radio in the kitchen and in the living room
- Having the controls in the smartphone

##### Use Case

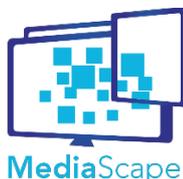
- Andy receives a call and the radio automatically pauses
- Andy hangs up the call, the radio automatically resumes in the same place

##### Requirements

- **Pause / resume / seek**
- **Media Synchronisation**
- **Context Event Listener**

## 5.4. SocialTV

James is sitting at home watching the TV programme Breaking Bad. His second screen device shows that Alex is on episode 10, Bob is on episode 11, whereas he's on episode 9. So he watches two episodes so he can talk later about it at work. The next day, he sees a notification that Jo and Sara are watching a quiz together, so he joins in and watches and plays with them. The next day he doesn't know what to watch. He gets a notification on his TV that Jo and Sara are watching a live political discussion programme. He joins the programme. On a second screen device he can see the latest comments from Jo and Sara. He can watch and comment and talk



Project	Document Title	
Dynamic Media Service Creation, Adaptation and Publishing on Every Device MediaScape (610404)	D2.1 Usage Scenarios and Requirements	
Version	Date	Author
3.0	09th March 2015	BBC, VIC, IRT, NEC, W3C, NOR, BR

with Jo and Sara.

#### 5.4.1. UC16: Personalised TV Programme Guide

##### Prerequisites

- A playlist / programme guide web application is available (either broadcaster-provided or cross-broadcaster)
- James has signed up to use this web application

##### Use Case

- James opens a TV playlist / programme guide web application on his mobile or tablet device
- The web application presents a list of programmes available for James to watch
- The web application shows that the last episode James watched was Episode 9
- James selects to view Episode 10 on his mobile or tablet device

##### Requirements

- **Authentication:** the Web application requires the user to sign in to view personalised content
- **Programme Information:** the web application displays cross-broadcaster programme information and lists of on-demand A/V media content
- **User Tracking**

#### 5.4.2. UC17: Sharing TV Viewing Information in a Social Group

##### Prerequisites

- A playlist / programme guide web application is available (either broadcaster-provided or cross-broadcaster)
- James, and his friends Alex and Bob, have all signed up to use this web application

##### Use Case

- James opens a TV playlist / programme guide web application on his mobile or tablet device
- The web application presents a list of programmes available for James to watch
- The web application shows that the last episode his friends Alex and Bob watched are Episode 10 and 11 respectively
- James selects to view Episode 10 on his mobile or tablet device

##### Requirements

- **Authentication:** the web application requires the user to sign in to view personalised content
- **Programme Information:** the web application displays cross-broadcaster programme information and lists of on-demand A/V media content
- **User tracking**
- **Social Graph**

#### 5.4.3. UC18: Sharing a Link to a Live TV Programme

##### Prerequisites

- A playlist / programme guide web application is available (either broadcaster-provider or cross-broadcaster)



Project	Document Title	
Dynamic Media Service Creation, Adaptation and Publishing on Every Device MediaScape (610404)	D2.1 Usage Scenarios and Requirements	
Version	Date	Author
3.0	09th March 2015	BBC, VIC, IRT, NEC, W3C, NOR, BR

- James is watching a comedy show on his TV
- James has a mobile device with him
- Jo and Sara are watching a live discussion programme on a DVB-T/S channel
- Sara decides to send James a link to the live discussion programme

#### Use Case

- Sara opens a TV playlist / programme guide Web application on her mobile or tablet device and signs in
- The web application determines that the TV is showing the live discussion programme
- Sara selects to share a link to the programme she is currently watching
- Sara selects to share the link with James
- James's mobile device receives a notification from Sara
- James opens the notification within the Web application and signs in
- The Web application displays the title and channel of the programme, and a link to view the programme

#### Requirements

- **Authentication:** the web application requires users to sign in to view personalised content
- **Timeline based synchronisation:** users can share links to A/V content with other users. Links can reference either internet or broadcast content, and may optionally include playback position (time).
- **Device notifications:** users can receive notifications on their personal devices

#### 5.4.4. UC19: Controlling a TV from a Web Page: Play On-Demand Media

This Use Case is an extension of UC16, Personalised TV Programme Guide.

#### Prerequisites

- A playlist / programme guide Web application is available (either broadcaster-provided or cross-broadcaster)
- James has signed in to use this Web application

#### Use Case

- James opens a TV playlist / programme guide Web application on his mobile or tablet device
- The Web application presents a list of programmes available for James to watch
- The Web application shows that the last episode James watched was Episode 9
- James selects to view Episode 10 on his mobile or tablet device
- The Web application offers to play the video either on the same device, or on his TV device
- James selects to watch on the TV
- The web application instructs the TV to play "Breaking Bad" Episode 10
- The TV plays the selected episode from an Internet stream

#### Requirements

- **Device discovery:** the web page is able to discover a TV device belonging to the authenticated user
- **Capability discovery**
- **Association / pairing**



Project	Document Title	
Dynamic Media Service Creation, Adaptation and Publishing on Every Device MediaScape (610404)	D2.1 Usage Scenarios and Requirements	
Version	Date	Author
3.0	09th March 2015	BBC, VIC, IRT, NEC, W3C, NOR, BR

#### 5.4.5. UC20: Controlling a TV from a Web Page: Change Channel

This Use Case is a variation of UC19, Controlling a TV from a Web Page: Play On-Demand Media, but in this case the Web page instructs the TV to tune to a specific DVB-T/S channel.

##### Prerequisites

- A playlist / programme guide Web application is available (either broadcaster-provided or cross-broadcaster)
- James has signed in to use this Web application

##### Use Case

- James opens a TV playlist / programme guide Web application on his mobile or tablet device
- The web application shows that his friends Jo and Sara are currently viewing a live discussion programme
- James selects to view the same programme as his friends
- The Web application offers to play the video on his TV device
- James selects to watch on the TV
- The web application instructs the TV to tune to the appropriate DVB-S/T channel
- The TV tunes to the specified DVB-S/T channel and shows the discussion programme

##### Requirements

- **Device discovery:** the Web page is able to discover a TV device belonging to the authenticated user
- **Capability discovery**
- **Device association / pairing**
- **Social Graph**
- **Authentication**

#### 5.4.6. UC21: Commenting alongside a Live TV Programme

##### Prerequisites

- James, Jo and Sara are watching a live discussion programme on TV
- James, Jo and Sara are all signed in to the programme's companion web application on their mobile/tablet devices

##### Use Case

- On his tablet device, James can read the previous comments Jo and Sara have made about the discussion programme
- The tablet device displays new comments as they appear, synchronised with the TV media stream
- James types a comment into his tablet device
- The comment is shared with Jo and Sara and appears on their mobile/tablet devices

##### Requirements

- **Authentication:** the Web application requires users to sign in to view personalised content
- **Timeline based synchronisation:** user comments are associated with time points in the broadcast A/V media
- **Social Graph**



Project		Document Title
Dynamic Media Service Creation, Adaptation and Publishing on Every Device MediaScape (610404)		D2.1 Usage Scenarios and Requirements
Version	Date	Author
3.0	09th March 2015	BBC, VIC, IRT, NEC, W3C, NOR, BR

- **Adding user inputs to the timeline**

#### 5.4.7. UC22: Commenting alongside an On-Demand TV Programme

This Use Case is a variation of UC21, Commenting alongside a Live TV Programme.

##### Prerequisites

- James, Jo and Sara each watch a discussion programme on TV. The programme is an on-demand video stream, and so the users are watching at different times.
- James, Jo and Sara are all signed in to the programme's companion web application on their mobile/tablet devices

##### Use Case

- On his tablet device, James can read the previous comments Jo and Sara have made about the discussion programme. The comments are synchronised with the programme timeline
- James types a comment into his tablet device, the comment is associated with a point in time in the programme
- The comment is shared with other users who view the same content, synchronised with the programme timeline. This includes comments from users that viewed the programme live, rather than on-demand

##### Requirements

- **Authentication:** the web application requires the user to sign in to view personalised content
- **Timeline based synchronisation:** user comments are associated with time points in the A/V media
- **Social Graph**
- **Adding user inputs to the timeline**

## 5.5. Requirements Summary

Requirement	Workpackage
Device pairing / association	3
Device Discovery	3
Service Discovery	3
Device notifications	4
Timeline-based synchronisation	4
Media Synchronisation	4
Content Adaptation and Migration	5
UI Adaptation	5
Session Control	4
Pause / Resume / Seek	4
User Authentication	3



Project		Document Title
Dynamic Media Service Creation, Adaptation and Publishing on Every Device MediaScape (610404)		D2.1 Usage Scenarios and Requirements
Version	Date	Author
3.0	09th March 2015	BBC, VIC, IRT, NEC, W3C, NOR, BR

Social Graph	3
Programme Information	App specific
Injected Metadata Available	4
Adding User Inputs to Timeline	4
Capability Discovery	3
Local Network Discovery, Pairing, and Control	3
Context Event Listener	4
User Content History	App specific

## 6. Conclusions

This deliverable documents four MediaScape scenarios describing potential prototypes, illustrating the main concepts and devices of interest in the project. It describes the processes by which the project partners as a group decided on the scenarios that were most of interest from a large initial number. It breaks down the scenarios into use cases describing small amounts of functionality and uses those to derive requirements for the system and applications.



Project		Document Title
Dynamic Media Service Creation, Adaptation and Publishing on Every Device MediaScape (610404)		D2.1 Usage Scenarios and Requirements
Version	Date	Author
3.0	09th March 2015	BBC, VIC, IRT, NEC, W3C, NOR, BR

## Annex 1: Detailed partner scenarios

These are the initial 20 scenarios as selected by the partners, included here for reference.

### 6.1. 43-ALL: Commuting quiz show

#### 6.1.1. Scenario

A man is on the bus - participating in the quiz with friends while watching a gameshow. When he gets home, his smart TV gives him the option to continue to watch the show and play.

#### 6.1.2. Use Case

Prerequisites:

- User is on a bus watching TV on their tablet
- The tablet receives and plays live video
- An overlay on the tablet allows him to compete with his friends in the show

Steps

- When the user arrives home the tablet discovers the TV
- The tablet asks the man if he wants to continue watching and playing on the TV
- He clicks yes
- The TV show starts playing on the TV
- The game controls and notifications stay on the tablet

#### 6.1.3. Requirements

- User activities in a game must be closely synchronised with video / audio and other activities from the point of view of all players, even if they are playing over different types of network, including those with lag
- Devices must have a mechanism to detect that a known device is nearby OR that a potential new device is available and the roles it can undertake
- Connection between devices must be persistent OR use a lightweight mechanism once the initial connection has been made
- The control interface for the user must be separable from the video so that it can be used to interact with one device from another

### 6.2. 36-IRT: Device pairing / Surrounding radio at home

#### 6.2.1. Scenario

Andy sits on the couch and browses the website of his favourite radio/TV station on a laptop, and notices something interesting is on the radio right now. The Webpage recognises that a MediaScape enabled device is available in the living room. Instead of playing back the radio in the browser, a dialog pops up, offering the option to use the radio in the living room to playback the audio.

#### 6.2.2. Use Case



Project	Document Title	
Dynamic Media Service Creation, Adaptation and Publishing on Every Device MediaScape (610404)	D2.1 Usage Scenarios and Requirements	
Version	Date	Author
3.0	09th March 2015	BBC, VIC, IRT, NEC, W3C, NOR, BR

- User browses to the website of his favourite radio station using a laptop
- The web browser detects that there's a playback-capable radio device near to the user
- The web browser asks the user if he would like to listen to the show on the radio device
- The audio comes out of the radio device
- The user continues to browse elsewhere on the web and the audio continues to play on the radio device

### 6.2.3. Requirements

- The web browser can have a mechanism to detect that a potential new device is available and the roles it can undertake
- Devices must have some means to interpret each other's descriptions of capabilities
- Devices must have mechanisms to accept or reject instructions based on trust metrics
- A radio device can have the capability to be able to play a DAB / FM / Audio stream when instructed to by a trusted device
- The instructing device must be able to do other things once the stream has been initiated

## 6.3. 42-ALL: Marauders Glastonbury Map

### 6.3.1. Scenario

Some friends are at the music festival held in Glastonbury, with one friend at home watching on TV. They want to collectively decide which stage to visit. They prefer to watch something together rather than apart and they don't want to go to a stage that is very busy. An application shows the site, the location of the friends on the map and the density and flow of the crowd. The friends vote on who to go and see using a voting application that shows when and where the bands are playing. They can also add comments on why they picked certain options. The friend at home can vote and comment too.

The smart phones of the friends at the festival have accelerometers can see who is moving, dancing, how much people are having fun, and the result can be visualised.

### 6.3.2. Use Case

Prerequisites:

- Some friends are visiting a festival together
- They all have smart phones or devices which are connected to a network
- A friend at home is following along watching the event with her phone paired with the TV

Steps

- Once the users arrive at the location, the application service notifies them that an application is available
- The users install and run the application
- The a friend at the event sends the remote user a link to the application
- The application requests access to their GPS location and accelerometer data
- The application shows a map of the site and their locations on it
- The application sends location and accelerometer data back to the service
- The application has a mechanism to add friends, both local and remote
- The application shows the location of the friends on the map to each of the people in the group
- All users can see the density and flow and activity of the rest of the crowd on the map
- The application shows upcoming bands, locations and times
- The application allows the friends to see what everyone else plans to watch in the future, anonymised
- The application allows the friends to vote on options, and comment
- The friends travel to and watch the band they have collectively chosen together
- The home user's switches to the stage the friends are at
- The person at home can see where their friends are on the map
- The friends can send video from the smartphone and share with their friend at home



Project	Document Title	
Dynamic Media Service Creation, Adaptation and Publishing on Every Device MediaScape (610404)	D2.1 Usage Scenarios and Requirements	
Version	Date	Author
3.0	09th March 2015	BBC, VIC, IRT, NEC, W3C, NOR, BR

- People at the event and watching the TV can see accelerometer feedback from people at the event, in aggregate, visualising which things get the audience going
- Later, the friends can re-find the videos and comments at home, and replay them

### 6.3.3. Requirements

- Services can be advertised within bounded physical locations
- Data about individuals can be aggregated, anonymised and displayed back to them and others in real time
- Applications can allow individuals to form adhoc groups who can have identifiable data about their members
- Applications can allow members of a group to vote and comment on options
- Comments and videos can be synchronised with a video of an event in real-time
- The video of an event can be replayed on demand with videos, images, comments and data replayed synchronised
- Smart TVs can change channel in response to a command from a paired device

## 6.4. 3-NOR Israeli Eurovision Night

### 6.4.1. Scenario

Young Beatrix challenges her Facebook friends to an Israeli Eurovision Night with spectacular hits selected from the 80's Israeli Eurosong contributions. The friends each select a song at eurovision.eu, that they wish to use. They go on to play it on their TV, while recording their personal soundtrack using the cell phone. All meet for an online Eurovision contest/party where each contribution is played simultaneously for all participants on their chosen devices. They all vote, and Beatrix acts as presenter. The visual overlay is bought cheaply from eurovision.eu, giving the whole event a touch of authenticity. They all share their contest on Facebook, and John also on Twitter to allow their social networks to see their performances (allowed to vote too!)

### 6.4.2. Use Case

#### Prerequisites

- A number of songs are available online to reuse and remix
- Infographics are available for reuse from Eurovision.eu
- An application is available that facilitates making your own EuroVision

#### Steps

- A host user creates a EuroVision web application by selecting a range of songs, graphics, a voting mechanism, and a maximum number of participants
- The host invites friends to participate on Facebook, stating a particular time and date for the show
- Various friends accept
- Each participating friend chooses a song
- Each participating friend plays back their chosen song while recording their own audio track on the same or a paired device
- Each uploads her / his audio track to the web application
- At the scheduled time, they meet online
- The show starts playing continuously like a normal TV programme
- The web application detects devices local to them
- They can select which device the show plays back on
- The host is presented with an extra user interface button which she uses to provide synchronised live



Project	Document Title	
Dynamic Media Service Creation, Adaptation and Publishing on Every Device MediaScape (610404)	D2.1 Usage Scenarios and Requirements	
Version	Date	Author
3.0	09th March 2015	BBC, VIC, IRT, NEC, W3C, NOR, BR

audio commentary

- All participants can comment using text in real time and see each others' comments
- Audio tracks are played back synchronised to the relevant video
- After all the tracks have been played, each is replayed for 20 seconds with a voting button displayed on the initial device
- All the participants vote
- The results are presented back to everyone,
- The winner is presented with an extra user interface button which she uses to do a live audio encore, which the application synchronises to the video
- Later they share the finished programme on Facebook and Twitter, but let anyone vote

### 6.4.3. Requirements

- Devices must be able to be paired to watch and listen on one device and create an audio track on another
- An application can detect local devices and their capabilities
- An application can play a different on-demand audio track synchronised to a video, to distributed participants
- An application can play a live on-demand audio track synchronised to a video, to distributed participants
- Voting can be synchronised to a central and user-apparent time window
- Infographics can be synced to video
- Synchronised commentary, comments, voting and all audio and video can be replayed on demand

## 6.5. 8-W3C Debate Newspaper

### 6.5.1. Scenario

Alex is watching a political debate on his TV. His phone lying nearby alerts him of a new notification. His favourite newspaper offers live commentary on the debate, with embeddable content on his TV. As the debate progresses the newspaper overlays information on how well each debater does, visible on his TV.

### 6.5.2. Use Case

Prerequisites

- User is watching political debate on tv set
- Phone previously paired with TV

Steps

- User's phone laying near to him detects the program he's watching and identifies that his favorite newspaper offers live annotations to the video feed
- The phone buzzes with a notification alerting the user he can get additional content from the newspaper
- User sees notification, accepts to get additional content on the phone
- The TV starts to show content overlaid on top of the video feed; that overlay is adapted live to avoid covering important parts of the screen

### 6.5.3. Requirements

- Paired devices must be able to detect when the user is watching programmes of interest on another device
- Paired devices should be able to notify the user of things they may be interested in, on other devices
- Third party media can be closely synchronised with live video content
- User interfaces should adapt to the device
- Overlaid user interfaces should adapt to the content



Project	Document Title	
Dynamic Media Service Creation, Adaptation and Publishing on Every Device MediaScape (610404)	D2.1 Usage Scenarios and Requirements	
Version	Date	Author
3.0	09th March 2015	BBC, VIC, IRT, NEC, W3C, NOR, BR

## 6.6. 9-W3C Video Call

### 6.6.1. Scenario

Stephanie is in a video call on her phone with her father, while her son watches TV. She switches the phone's display to the TV so that her son can see and hear his grandfather.

### 6.6.2. Use Case

#### Prerequisites

- User is on a video chat with her father on her smartphone
- Her son is watching a cartoon on the living room TV set
- TV and phone are paired

#### Steps

- Her father would like to speak with her son
- She moves the video chat to the tv screen and places her phone next to the TV to act as camera/microphone
- As she does this, the program on TV gets paused
- When they're done, the video chat disappears from the TV screen, and the TV show automatically restarts from where it was

### 6.6.3. Requirements

- Video and audio playback can be routed to available paired devices
- A device being used for a new purpose should remember what it was doing beforehand and return to that activity afterwards

## 6.7. 13-VIC Custom Extra Media

### 6.7.1. Scenario

Two people are watching TV together. They're interested in finding out more about the programme – about a particular plot point. Both can see an extended service on their devices. One continues with the extended information and the other goes to an on-demand programme because he's lost the thread of what's happening in the main story.

### 6.7.2. Use Case

#### Prerequisites

- User 1 is watching TV with user 2

#### Steps

- User 1 turns on her tablet and sees more information connected with the point in the show that she is at

### 6.7.3. Requirements

- A paired device can detect the point in the show which the user has got to
- It can then display related content if available



Project		Document Title
Dynamic Media Service Creation, Adaptation and Publishing on Every Device MediaScape (610404)		D2.1 Usage Scenarios and Requirements
Version	Date	Author
3.0	09th March 2015	BBC, VIC, IRT, NEC, W3C, NOR, BR

## 6.8. 30-BR The Question

### 6.8.1. Scenario

Tiara switches on her smart phone and finds a message that says that one of her favourite programs “The Question” needs a new question to answer. She types in the question she would like to be answered: “Should I quit my membership in the catholic church?” and votes for the ones she finds interesting. A week later she finds another message. Unfortunately her question has not been chosen. But the chosen one is also quite interesting. It’s “Is it ok to eat meat?”

Later that evening she switches on her computer and sees that many more users have commented on the chosen question. She writes a short comment: “Great question! I really would like to know if it is true that eating meat is bad for the environment.”

Two days later in the morning she gets another message of “The Question” that tells her that the reporter is going to a slaughterhouse today to see how that works and find out how bad animals are treated there. The reporter promises to publish a video later. In the evening the reporter has put the video online. It is really awful how the animals are slaughtered. The guy in the slaughterhouse reassures the reporter that the animals do not feel anything when killed. The reporter promises to go to a more independent person to find out about that.

Tiara has a friend (Elena) studying biology at university. She pushes the video to Elena and asks whether she knows someone who the reporter could talk to about that. Elena actually adds a comment on “The Question’s” website: the reporter should talk to her professor.

A week later Tiara gets another message. “The Question” tells her that the TV Show to “Is it ok to eat meat?” is ready for broadcast and on TV tonight. Unfortunately she has a date this evening. With her Smart TV she goes to the website the next evening and finds the complete TV show online. She watches it on demand and sees the comments other users have added to certain sequences. She comes to the part where the show talks about environment and sees that meat is quite bad for the CO2 in the atmosphere but not only meat but also soy. She clicks on the link that is given her right next to the video and pushes the content to her tablet, so she can read the offered statistics, graphs and a text about that topic. She finds that very informative. After reading it she goes on watching the show. Later in the show Elena’s professor is on and Tiara can see that Elena has added some comments in that sequence. She also writes a short comment.

The telephone is ringing. She stops the show. It’s her friend Thomas. He tells her about a party he is going to now and asks her to come. It’s quite a long way on the tube but she says yes. She takes her smartphone, finds “The question”, which she is watching on her Smart TV right now, there as well and presses the “Make it offline available button”. So she can watch the end of the show on her smart phone while going to the party.

### 6.8.2. Requirements

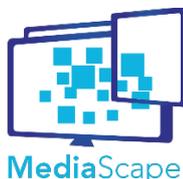
- Watch on demand; nevertheless get comments and interact
- Get additional information; push it to another device
- Push content to another device and make it offline available

## 6.9. 41-ALL Concert upload UGC

### 6.9.1. Scenario

Jo sees an advert for a concert at a bus stop. The advert advertises itself as a service that can provide related content. It looks really interesting so she turns on her MediaScape enabled phone, which notifies her that the advert service is available, so she captures more information from it to look at later

The information says that you can submit your own song to the event and that the best one will get to perform, so she and her friends record a version of one of the songs and submit it to the show via Jo’s phone. Before the show starts (also during the show) they can vote on who has made the best version. They can also vote on the playlist that the brand plays. Sometime during the show the winners are announced. Competition winners perform live at the break from their homes, with the band who are on stage. Later, everyone can watch all the performances and continue with them.



Project	Document Title	
Dynamic Media Service Creation, Adaptation and Publishing on Every Device MediaScape (610404)	D2.1 Usage Scenarios and Requirements	
Version	Date	Author
3.0	09th March 2015	BBC, VIC, IRT, NEC, W3C, NOR, BR

## 6.9.2. Use Cases

### Use Case 1: Second screen application for live TV broadcast

#### Prerequisites:

- User is at home watching their connected TV
- The TV receives and plays video over DVB-T/S broadcast
- The live concert show is currently being broadcast, but the TV is tuned to a different channel
- The user's tablet device is on the same wifi LAN as the connected TV

#### Steps:

- On her tablet device's browser, the user opens the URL she bookmarked earlier from the public ad display
- The browser displays the web page associated with this concert TV show
- The web page asks the browser if there is a connected TV available on the network
- The browser responds with a list of all TVs found (one in the living room, one in the bedroom)
- The web page displays a "watch on your TV" button, together with the list of TVs found
- The user selects the living room TV from the list (this is the one she is watching; someone else is watching the other TV in the bedroom)
- The web page commands the TV to tune to the channel that is showing the live concert
- The web page remains open, and now displays an interactive application that relates to the TV programme

### Use case 2: Voting on performances

#### Prerequisites:

- User has launched a second screen application

#### Steps:

- At certain points in the TV programme, excerpts of user-contributed music performances are broadcast
- During this segment of the broadcast, the web page on the second screen application displays "vote up this act" and "vote down this act" buttons
- The user thinks the current act is good, so she presses the "vote up this act" button
- The web page sends the user's vote to the TV programme's website
- The website accumulates this vote with all other user votes
- A display wall in the TV studio shows which acts are popular (or not) with viewers, and this updates in real time as votes are received

### Use case 3: Synchronised internet delivered content with broadcast TV

#### Prerequisites:

- User has launched a second screen application

#### Steps:

- The webpage displays live information related to the programme, in sync with the broadcast video, such as title and lyrics for the song currently being played, with
- karaoke-style highlighting of words in the lyrics



Project	Document Title	
Dynamic Media Service Creation, Adaptation and Publishing on Every Device MediaScape (610404)	D2.1 Usage Scenarios and Requirements	
Version	Date	Author
3.0	09th March 2015	BBC, VIC, IRT, NEC, W3C, NOR, BR

#### Use case 4: Multi-stream synchronisation

##### Prerequisites:

- The competition winner is at home and has a MediaScape-compatible device capable of recording and streaming high quality audio and video

##### Steps:

- The competition winner starts a live two-way video stream with the TV studio. The stream delivers high quality audio and video in both directions, with low latency so there is minimal delay (essential for musical performance)
- The user opens their browser on the TV studio's "upload your video" web page
- The web page asks the browser whether audio/video input is available
- The browser asks the user if they want to start audio/video streaming to the server
- The user confirms this
- The browser enables the camera and microphone on the device and starts streaming the media to the server
- In the studio, the performer watches the video stream from the user at home
- In the studio, the video stream from the user at home is mixed with the video captured of the performer on stage (e.g, picture-in-picture), and the resulting video stream is sent for broadcast payout
- Viewers at home see the performer on stage singing together with the competition winners at home

#### 6.9.3. Requirements

- Bookmark reference / link from a public display
- API from webpage to browser for device detection
- Control of TV from web page
- Interactive connected and synchronised application for a playing programme in web page
- Live two-way synchronised stream through browser

### 6.10. 2-NOR Modularised Construction

#### 6.10.1. Scenario

Covering a high stakes Chess match, the producer is provided with a number of different visualizations. They can all be controlled by shared timing information, and can as such be "dragged and dropped" into a web page with no interaction or "glue" between the visualizations .

The producer creates visualizations that fit target audience as well as different devices (option without video for mobile devices etc).

Users can also alter their own views based on the same components.

#### 6.10.2. Use Case

- Producer of chess game has multiple "widgets" to visualize data
- All widgets controlled by shared motion, meaning no glue is needed between them even when user navigates within the game
- Producer creates multiple presentations based on game state and target devices (mobile and tablet).
- End users can create custom views if they feel they lack information



Project	Document Title	
Dynamic Media Service Creation, Adaptation and Publishing on Every Device MediaScape (610404)	D2.1 Usage Scenarios and Requirements	
Version	Date	Author
3.0	09th March 2015	BBC, VIC, IRT, NEC, W3C, NOR, BR

### 6.10.3. Requirements

- Data / visualisations can be synchronised to video

## 6.11. 10-W3C Concert Video Wall

### 6.11.1. Scenario

At a concert, the audience takes pictures of the band on stage. When they've taken the picture, it appears on the giant screen at the back of the stage making the audience feel part of the show.

### 6.11.2. Use Case

- Audience at a concert gets connected to a Web app only available to people on site
- Once connected, they can upload pictures / videos via that app
- They can also stream video from their phones
- Videos and pictures get displayed on the video wall at the back of the stage

### 6.11.3. Requirements

- Services in a location can be advertised to end users
- Devices can be temporarily paired with public services
- Media can be routed to a different screen
- Pictures and video can be synchronised to a time and location

## 6.12. 27-BBC Public Screen Know More on Mobile Phone

### 6.12.1. Scenario

Charlie arrives at the train station after work. He sees a news clip on the big screen and wants to know more. He connects his phone to the big screen. He needs to catch his train, but he can see more about the story on the train.

### 6.12.2. Use Case

- Charlie arrives at the train station after work
- While waiting for the platform to be announced, he sees an interesting news clip on the large public display screen about the football
- He connects his phone to the big screen
- The phone asks him if he would like more information on recent reports on the big screen
- Charlie chooses the one he wants, and his phone gets the full report, either as a link or download-and-take-with-you file
- He goes to catch his train and can watch the full report on his way home

### 6.12.3. Requirements

- Services in a location can be advertised to end users
- Devices can be casually paired with public services
- Devices can find out what stories are currently being displayed and recently displayed
- Offline versions of content can be available
- Content can be available in different formats



Project	Document Title	
Dynamic Media Service Creation, Adaptation and Publishing on Every Device MediaScape (610404)	D2.1 Usage Scenarios and Requirements	
Version	Date	Author
3.0	09th March 2015	BBC, VIC, IRT, NEC, W3C, NOR, BR

## 6.13. 29-BBC Series Keeping Score

### 6.13.1. Scenario

Eddie and Frank love the 'Great British Bake-off'. Every year they each pick a winner in the first episode. This year, Eddie is team Jon, and Frank is team Tom. Each week they pick a winner too, especially if someone is having a good day. Eddie is picking a lot of winners. They can both see each others' scores. At the end of the series, the loser bakers the winner a cake.

### 6.13.2. Use Case

Prerequisites:

- User 1 and User 2 watching a programme together in the same room
- Devices are paired with the TV

Steps

- When they switch on the first episode, their TV tells their phones that there's a play-along web application available for this series
- Their paired devices detect it and offer to open it
- The users both open it
- Web page requests the browser to detect other nearby devices
- Web page asks each user if they want to play together
- Each user accepts the other as a friend for the programme
- The web application groups User 1 and User 2 into a team
- The web application offers a list of contestants to support
- The web application remembers who each is supporting week on week, and gives them a running commentary on the person's progress
- It lets them support other contestants for the duration of a single show
- At the end of a series they get their scores per show and series

### 6.13.3. Requirements

- Paired devices can detect that a show has an additional downloadable application
- Unpaired devices can detect each other and form a persistent connection

## 6.14. 33-NEC Game Map Review

### 6.14.1. Scenario

Eve is going to the mall. While window shopping she recognizes an advertisement for a new video game on a public display. As she approaches the display she picks up her smartphone. The smartphone directly detects the public display and synchronizes with the currently played advertisement. The smartphone loads automatically a composition of companion services to the advertisement. The offered service composition presents Eve a map of the mall with the shops marked which offer the new video game, an overview of reviews and the most prominent threads in the official forum. The map to the shops is most prominently presented.

Eve is mostly interested in the reviews about the game. While reading the reviews she is looking up some videos of the game trying to verify some details of the reviews. As the shop which is selling the game is viewing range of the advertisement Eve does not look up the shop on the map but walks directly to the shop. As she puts away her phone her activity stream on the phone is uploaded to the user.



Project	Document Title	
Dynamic Media Service Creation, Adaptation and Publishing on Every Device MediaScape (610404)	D2.1 Usage Scenarios and Requirements	
Version	Date	Author
3.0	09th March 2015	BBC, VIC, IRT, NEC, W3C, NOR, BR

On the other side of the mall Mark sees the same advertisement and is also picking up his smartphone. As Eve he is mostly interested in the reviews but since he is unaware of the gaming shops location he is also interested in directions to the shop and looks up the map. As he enters the shop and puts away his phone his activity stream is also reported to the user analytics server.

The uploaded activity streams of Mark and Eve are analyzed on the user analytics servers. The analytics detects out of the raw activity streams Marks' and Eves' activities and in what order they did them. Additionally the analytics server gets provided with the sensor information of sensors attached to the public displays and the sensors within the smartphone. The results of the user analytics state that the majority of people looking at the advertisement behaved in a similar way as Mark and Eve in regards to reading the review. 90% of the people at Marks location where looking up the map independent of the time of the day. In Eves' location the system detects that during a high noise level (reported by sensors attached to the display) 80% of the people look up the map.

The Actionable insights generator takes the results of the user analysis and provides recommendations on which the service aggregation can directly act on.

The service aggregation takes the recommendations and reorganizes the service composition so that in Eves' position the map to the shop will be prominent on rush hours in the mall on other times the reviews of the game will be prominent. In Marks' position the map to the shop will be permanently prominent. Since almost no one took a look at the game forum it was replaced by the gameplay videos Eve looked up.

#### 6.14.2. Use Case

Prerequisites:

- User is in the mall
- User is interested in a video game

Steps

- User sees advert
- User switches on mobile phone
- Phone detects advertisement
- Phone downloads and displays companion application
- Phone detects user's location
- Phone shows related content and maps
- Phone tracks users activities and movement
- Phone uploads data to a central server

#### 6.14.3. Requirements

- Lightweight detection and pairing of proximate content

## 6.15. 35-IRT Multi-source Group Recommendations / Playlist

### 6.15.1. Scenario

Andy sits on the couch, browsing the personalized EPG on his tablet, as his wife Christine enters the room, sits down besides him and turns on the TV. She logs in both users on the TV, and Andy pushes the EPG app onto the TV. There, the EPG automatically adapts to the layout as well as to the new context of the app, since now, there are two users to create a recommendation for. So the recommender used by the EPG filters the available content based on the user profiles of both, Andy and Christine. They get recommended two movies in a row which suits their expectations, and they prepare for a nice movie evening. Since there's a break of 20 minutes in between those two movies, the recommender fills this gap by adding two content items in between: the "making of" of the first movie (video on demand) and an interview of the producer of the second movie (a podcast).

The multi-source recommendations, consisting of live TV, on- demand video and podcasts, are enabled through the recommender being connected to metadata covering content from all these sources (IRTs metadata



Project	Document Title	
Dynamic Media Service Creation, Adaptation and Publishing on Every Device MediaScape (610404)	D2.1 Usage Scenarios and Requirements	
Version	Date	Author
3.0	09th March 2015	BBC, VIC, IRT, NEC, W3C, NOR, BR

integration Web-service); The group recommendations are realized through IRT's group recommender Web-service

### 6.15.2. Use Case

Prerequisites:

- Paired devices with TV
- Recommendations backend services
- User 1 is browsing EPG on personal device

Steps:

- User pushes EPG to TV screen
- Login user 1 and user 2 to the TV
- Suggested programmes are shown on the TV screen

### 6.15.3. Requirements

- Push user interface from one device to another
- Detect that more than one person is watching TV
- Maintain preferences of both people

## 6.16. 39-ALL Advertising as Social Games

### 6.16.1. Scenario

While watching a boring show, Sarah gets asked to join a different channel, where there's a competition to spot how many animals appear in the ad break. She joins the show with her friends and they compete to see how spots the most. At the end she gets her score and some statistics for the game.

### 6.16.2. Use Case

- Sarah is watching a show, it's not very engaging
- She gets a notification on her phone that two of her Facebook friends are watching and participating with the friendwatch show on channel 4
- She clicks the 'join' button on her phone - the tv goes to the friendwatch programme, a live broadcast, on channel 4
- Her friends get notifications on their TVs that she has joined
- Just before the ad break, they all get instruction about the ad-break competition on their TV. In this case it's about spotting the number of animals in the break
- Sarah presses the "animal" button, on her phone when she spots one in the ad break
- The phone keeps score: who spotted it first and how many they get right
- Just before the show restarts, there's a summary of the quiz on the TV screen, and some stats about how many people participated
- Simultaneously the three friends get an update on their phones about which of the three got the best score and they have the option to post

### 6.16.3. Requirements

- Notifications from social networks on paired device
- Link on paired device lets you change TV set
- Posting to social network automatically from second screen and TV
- Notion of synchronisation - who was first voting; you clicked the wrong button - time sensitivity
- Locally displayed content - alternating between local and displayed content
- Join joined - notification on the TV screen



Project		Document Title
Dynamic Media Service Creation, Adaptation and Publishing on Every Device MediaScape (610404)		D2.1 Usage Scenarios and Requirements
Version	Date	Author
3.0	09th March 2015	BBC, VIC, IRT, NEC, W3C, NOR, BR

## 6.17. 40-ALL Social TV Experience

### 6.17.1. Scenario

A guy sitting at home watching breaking bad. His second screen device shows that Alex is on episode 10, Bob is on episode 11, whereas he's on episode 9. So he watches two episodes so he can talk later about it at work.

The next day, he sees a notification that Jo and Sara are watching a quiz together, so he joins in and watches and plays with them.

The next day he doesn't know what to watch. He gets a notification on his TV that Jo and Sara are watching a live programme - political discussion. He joins the programme. On a second screen device he can see the latest comments from Jo and Sara. He can watch and comment and talk with Jo and Sarah.

### 6.17.2. Use Case

Prerequisites:

- Device paired with TV

Use Case 1: No spoilers

- Steps
- Switch on TV
- Watch a TV show on catch up
- User sees notification on paired device about friends' progress through the show series
- User makes decision about what to watch today

Use Case 2: Join live show with friends

Steps:

- Switch on TV
- See notifications on paired device about friends watching a live show
- Click on notification on second screen to change the channel on the TV
- Use second screen to join in playing the quiz

### 6.17.3. Requirements

- Access to list of friends
- Notifications on TV
- Notifications on paired device
- Ability to switch to a live programme using paired device

## 6.18. 1-NOR Producing Partial Media

### 6.18.1. Scenario

BBC offers audio commentary for F1 production. They may sell this as a standalone product even if they do not have the rights to broadcasting the video content. Foreign broadcasters with such rights may want to buy BBC's live audio commentary - because it's good - as can individual viewers across the world.

### 6.18.2. Use Case



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- BBC produces F1 commentary and second screen content
- Ole watches F1 from the Norwegian broadcaster (SportN), but is highly dissatisfied with their quality of commentary and lack of second screen material
- Ole visits the BBC web site, and buys access to their coverage
- The BBC only provides the parts of the coverage they are allowed to (in particular, no actual race video)
- The second screen material synchronizes with Ole's TV (showing the feed from SportN)
- He mutes his TV and enjoys a much better F1 coverage

### 6.18.3. Requirements

- Synchronized second screen material to official video feed
- Synchronized playback to primary screen material from a different provider (but based on the same feed)

## 6.19. 4-NOR Transferring Presentation Between Devices (Hiding Technology)

### 6.19.1. Scenario

Peter is watching a show from the national broadcaster while commuting. As the train nears the station he pauses. He is quite eager to see the end of the show though, so as soon as he enters home he wants to resume it. The broadcaster's app on the smart TV has his personal list of shows on the front page, with the most recent one on top. Peter simply presses the resume button, forgetting that "So you think you can dance" is about to start. There's an outcry as his daughter realizes someone is blocking her plan to watch it. Peter submissively opens the show on his laptop too. For a brief moment the show is presented in tight synchrony by the TV and the laptop. At this point Peter can safely vacate the smart TV.

### 6.19.2. Use Case

Prerequisites:

- User is on a train watching TV on their mobile phone
- The phone receives and plays live video over IP

Steps:

- User watches a television show on his mobile phone while traveling on the train
- He pauses the show on his phone when getting off the train, and walks home
- He turns on his TV when home and current show is suggested on top
- He selects 'continue current show'
- His wife arrives home, and demands to use the TV set
- User turns on his tablet
- The show is visible in notifications on the tablet
- User clicks on the notification
- The show immediately starts playing because he didn't pause it
- User vacates the TV and completes watching the show on his tablet in another room

### 6.19.3. Requirements

- MediaScape connected devices must be able to resume media playback regardless of the network they are on
- Connection between devices must be persistent OR use a lightweight mechanism once the initial connection has been made
- Devices should give appropriate notifications for available actions



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## 6.20. 6-NOR Switching Content Backend (Hiding Technology)

### 6.20.1. Scenario

Anne looks at a comedy show live on BBC 1 on her SmartTV over DVB-T. She pauses the stream to go make herself a coffee. Anne resumes playback, which is fetched over the Internet from a live-window. Anne does however not realize this. She has to pause again to drive her son Anthony to soccer practice. When she comes back home, she again resumes the show. This is now fetched from the catch-up TV service, but she still does not notice any difference.

### 6.20.2. Use Case

Prerequisite:

- User watches live TV (DVB-T) on TV set

Steps:

- User pauses live TV
- User resumes watching a few minutes later
- TV switches to http from live backend
- User pauses again
- User resumes after a few hours
- TV switches to archive

### 6.20.3. Requirements

- TV has persistent view of user activities
- Video service switches to the most appropriate source depending on provider delivery requirements
- Video delivery mechanism is hidden from the end user



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## References

- [1] W3C Web and TV Interest Group, Media APIs Use Cases:  
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