FI content

D2.1

SCENARIO, FUNCTIONAL AND TECHNICAL REQUIREMENTS –RELEASE 1

September 2013

Abstract

This document describes the Social Connected TV scenarios in FI-CONTENT 2 including high level functional and technical requirements. The basis for the scenarios was the work completed in FI-CONTENT, Content Area B Professional Content. Using a standard template, each Social Connected TV scenario has been described including high level descriptions of the functional requirements and candidate enablers, information on its level of maturity and experimentation plans. Deliverable 2.2 provides detailed technical descriptions of the implemented scenarios. The descriptions below reflect the status of the scenarios at project month 06. User testing will identify technology gaps and missing functionalities. Where new functionalities are required, a scenario description of the new functionality will be created using the template in this document.

SEVENTH FRAMEWORK PROGRAMME

FUTURE INTERNET PPP

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EXECUTIVE SUMMARY

This document describes the Social Connected TV scenarios in FI-CONTENT 2 including high level functional and technical requirements. The basis for the scenarios was the work completed in FI-CONTENT, Content Area B Professional Content. Using a standard template, each Social Connected TV scenario has been described including high level descriptions of the functional requirements and candidate enablers, information on its level of maturity and experimentation plans. Deliverable 2.2 provides detailed technical descriptions of the implemented scenarios. The descriptions below reflect the status of the scenarios at project month 06. User testing will identify technology gaps and missing functionalities. Where new functionalities are required, a scenario description of the new functionality will be created using the template in this document.

The following scenarios are described in this document:

- Content Enrichment
- RBB TEXT
- ARD EPG
- Content Linking Across Devices
- Audio/Video Search Engine Optimisation (SEO)
- Activity Data and Cross-Device Resume Play
- Connected Encyclopaedia for Social TV
- Search & Discovery
- State & Quote on Social TV
- Cross-Screen Toolbox / Dashboard

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ABBREVIATIONS

CMS	Content Management System
DVB–T	Digital Video Broadcasting — Terrestrial
EPG	Electronic Programme Guide
GE	Generic Enabler
IPTV	Internet Protocol Television
SE	Specific Enabler
TAL	TV Application Layer
VoD	Video on Demand

1 - INTRODUCTION

1.1 – Overview

This document describes the Social Connected TV scenarios in FI-CONTENT 2 including high level functional and technical requirements. The basis for the scenarios was the work completed in FI-CONTENT, Content Area B Professional Content where scenarios were drawn up and improved through an iterative process of development and user testing. In FI-CONTENT 2 the Social Connected TV partners have continued to refine the scenarios in preparation for larger scale experimentations.

Using a standard template, each Social Connected TV scenario has been described including high level descriptions of the functional requirements and candidate enablers, information on its level of maturity and experimentation plans. Structuring the descriptions in this manner allowed us to identify possible technology gaps at an early stage, with a view to including these in open calls. Deliverable 2.2 provides detailed technical descriptions of the implemented scenarios.

The descriptions below reflect the status of the scenarios at project month 06. The scenarios will continue to evolve as the project progresses and we receive feedback from the experimentations sites and from developers and SMEs. All feedback will be evaluated and analysed. Where new functionalities are required, a scenario description of the new functionality will be created using the template below.

1.2 – Terminology

The document uses the term *functional requirement*. The usage of the term is intended to be in line with the definition provided by Wikipedia, extract: "*Functional requirements may be calculations, technical details, data manipulation and processing and other specific functionality that define what a system is supposed to accomplish*" [1]. Functional requirements are defined for Specific Enablers and for the scenarios that are built on the basis of the Specific Enablers. The functional requirements shall provide checkpoints in order to evaluate the state of maturity of the technical systems.

Functional Requirements are indexed. This allows referencing of requirements across documents. Indexes are assigned as follows:

Parameters	< Indicator – Use-case area>.<Indicator – Scenario or SE><Numerical>.< Indicator – Requirement><Numerical>
Values	*<TV | SC | G>.<S | SE><Numerical>.<R><Numerical>* • TV – Social Connected TV Platform • SC – Smart City Guide Platform • G – Games Platform • S – Scenario • SE – Specific Enabler

	• R – Requirement • Numerical – 1,2,3, …
Examples	• TV.S1.R1 (identifies the first requirement of the first scenario of social connected TV platform) • TV.SE3.R2 (identifies the second requirement of the third SE of social connected TV platform)

In the tables in chapter 2, the labels "GE", "SE", "Gap and "Application" are used to categorise candidate technologies that come into consideration for the implementation of the functional requirements that have been identified for each of the scenarios. The labels have the following meaning:

GE   The label is used for enablers provided by the FI-WARE platform.

SE   The label is used for technology components that are developed as part of the Social Connected TV Platform. SE labelled technology components are made available via the Social Connected TV Platform to SMEs and third party developers.

Gap   The label is used to indicate that currently there is no candidate technology available to provide the functional requirement.

Application   The requirement is implemented on application level.

2 - SOCIAL CONNECTED TV PLATFORM SCENARIOS

A template table for scenario descriptions is provided here. This template is completed for each scenario.

Scenario	Scenario title	
Category/topic/context	*Some keywords that help to classify the scenario*	
Owner(s)/contacts	*Identify contact persons who are responsible for the maintenance of the descriptions provided by this table*	
Abstract	*Provide a short description what this scenario is about.*	
Detailed description	*Provide a detailed description of the envisioned scenario.*	
Justification for inclusion of scenario	Audience/cultural criteria	*Why is this scenario interesting for people?*
	Academic criteria	*Why is this scenario interesting for research?*
	Commercial criteria	*What makes this scenario interesting for the business?*
Planned experimentation		
	Experimentation site	*Where will testing take place (e. g. Berlin, Lannion, Lancaster)?*
	Estimated schedule	*When will it take place (e. g. 1st cycle)?*
	Maturity of implementation	*What will be the dimension of the trial (lab, medium scale etc.)?*
	Content, provider, availability	*What content are you using?*

Functional requirements and their candidate enablers

Functional requirement		Candidate enabler	GE/SE/Gap
TV.Sx.Ry	*Name of the requirement* *Description of the requirement*	*Name of the Enabler* *Description of why this enabler has been selected*	
…	…	…	…
…	…	…	…

2.1 – Content Enrichment

Scenario	Content Enrichment	
Category/topic/context	Interactive multi-screen content	
Owner(s)/contacts	Robert Seeliger (FOKUS), Chris Krauss (FOKUS)	
Abstract	Creation and utilization of interactive content for social connected TV (HbbTV / SmartTVs) via multi-screen applications.	
Detailed description	The application will allow the creation, consumption and sharing of interactive TV content via a distributed, multi-screen app environment. The user will be able to connect a second screen and use it to create content annotations, comments etc. while watching the main video on the TV screen. The content, presented on the second screen, correlates to the topic shown on the television screen and transforms the habit of passively watching into an active process of interaction. For example, the user is watching a broadcast which includes an HbbTV application. After pushing the Red Button on the remote control a QR-Code appears which enables the connection of various devices. Once the connection is established the second screen offers additional information like recommendations, comments, related video content and more. The appearance/disappearance of this information on the second screen is subject to the presence of the content on the television screen. Imagine the scene shows a car; as long as the car is visible on the TV, the application will provide further information on the second screen. When the car disappears from the TV screen, the related content on the connected device also disappears. Furthermore, the application enables the user to make annotations, add additional video content and share all with others.	
Justification for inclusion of scenario	Audience/cultural criteria	• provides the user with more information on the content he can watch on TV • links TV content with web content that can be accessed and explored by the user in an interactive and very convenient way • parallel experience – the user can still enjoy watching TV while discovering more details and content-related information in parallel.

Scenario	Content Enrichment	
	Academic criteria	• the technical concept of content and object related supplemental information that are directly available to the user in addition to the video content is of interest • framework to enable interactive video which is based on open web technologies open up multiple application scenarios • we are looking for open architectures and open systems to develop interactive video services • syncing video content with web content • research on how users will interact with video content using their main screen as well as starting with a multi-screen service experience • which content parts should be displayed where? • how to present the content? • Interaction paradigms? • metadata formats, content formats
	Commercial criteria	• creates new business models for content providers, service providers and creative industries • interactive video is open for any web content that might be of interest for the user • second screen and multi-screen applications will allow parallel content consumption • user interaction is measurable • personalized content can be presented to the user (interactive ads, content related to documentaries, etc.) • social media functions help service and content providers to spread and market their offers to their target audience.

Planned experimentation	
Experimentation site	Berlin
Estimated schedule	1st experimentation cycle

Scenario	Content Enrichment	
	Maturity of implementation	Lab test (field trial to be discussed)
	Content, provider, availability	Demonstration content provided by FOKUS

Functional requirements and their candidate enablers

Functional requirement		Candidate enabler	GE/SE/Gap
TV.S7.R1	*Device discovery* Is needed in the process of connecting devices.	*Second Screen Framework* The Second Screen Framework provides a discovery mechanism.	SE
TV.S7.R2	*Content augmentation* Is needed to identify related content and allow the user to add content.	*Content Enrichment* This enabler adds an additional layer of information on top of video content.	SE
TV.S7.R3	*Application to application communication* Is needed to exchange information between applications running on different devices.	*Second Screen Framework* The enabler provides functionalities for the information exchange between different web applications running in the browser of certain connected devices. The exchange is realized by a server.	SE
TV.S7.R4	*Object database and storage* Is needed to deal with the large amount of Data.	*Cloud.ObjectStorage*	GE

2.2 – RBB TEXT

Scenario	RBB TEXT
Category/topic/context	Multi-screen TV applications
Owner(s)/contacts	Martin Gordon (RBB), Christoph Ziegler (IRT), Oliver Pidancet (RBB), Ralf Neudel (IRT)
Abstract	Communication between applications running in the browsers of (Hbb/ connected) TV devices and second screen devices (e.g. Tablets PC, Smart Phones) plus the automatic launch of applications.

Scenario	RBB TEXT	
Detailed description	**rbbtext** is an HbbTV application replacing the traditional teletext. It provides the same information as teletext but enhances the user experience with a more appealing UI design and increased interaction facilities. The envisioned scenario extends the feature set of the existing on-air HbbTV service **rbbtext** to include second screen functionalities. Users can connect their second screen device with their HbbTV device. To initiate the connection process, the users select the appropriate menu item in the **rbbtext**. The user is notified of the success of the connection process on both devices. Having confirmed this information on the TV device, the second screen version of the **rbbtext** is now automatically launched on the second screen. The user can now synchronously navigate through the **rbbtext** application. Wherever the user moves to on the one device, the application on the other device automatically follows. So the user can utilise his second screen device as an enhanced remote control. Furthermore the user has the possibility of hiding the application on the TV screen by clicking the appropriate menu item in the **rbbtext** application on the second screen. Thus the user can continue watching the broadcast video content on the TV screen while exploring the additional content on the second screen. The connection between the devices is persistent. When the user leaves the **rbbtext** application on one or both of the devices or switches one or both of the devices off, the connection can still be used whenever the user returns to the **rbbtext** without needing to run through the connection process again.	
Justification for inclusion of scenario	Audience/cultural criteria	• Using a Tablet is a more convenient way to navigate through rbbtext. • External web-links can be sent from the TV to or opened directly on the connected device.
	Academic criteria	Evaluate if and what mechanisms for connecting personal devices to TV applications are accepted by users. Collect further users' needs to enhance

Scenario	RBB TEXT	
		the existing or develop other use cases. See if people follow links offered by editorial staff or search for external sources. Using 2ⁿᵈ screen connection for more than one application / switch from application to application. Evaluate the acceptance of second screen applications and the users concerns about privacy issues.
	Commercial criteria	Engage viewer loyalty, provide personalised ways to maintain viewer interest.

Planned experimentation

	Experimentation site	Berlin
	Estimated schedule	1st experimentation cycle
	Maturity of implementation	Lab test and field trial (second screen enabled version of **rbbtext** is signalled via DVB-T in the area of Berlin and Brandenburg)
	Content, provider, availability	Existing on-air HbbTV service provided by rbb

Functional requirements and their candidate enablers

	Functional requirement	Candidate enabler	GE/SE/Gap
TV.S8.R1	*Device discovery* Is needed in the process of connecting devices. Before being able to actually assign devices to one another, they need to be aware of each other. A process for device discovery is needed in the upper scenario when the user requests the devices to connect by clicking on the appropriate menu item in the **rbbtext** application.	*Second Screen Framework* The Second Screen Framework provides a discovery mechanism which solves the issue by means of a QR-Code which the user scans with his second screen device.	SE
		An enabler that provides a way for an automatically discovering devices based on standard web technologies	Gap

Scenario		RBB TEXT	
TV.S8.R2	*Persistent device connection* Is needed to have a permanent knowledge of which devices belong to each other. This is crucial for being able to submit messages from a certain device to the appropriate destination.	*Second Screen Framework* The Second Screen Framework provides a device connection mechanism. It marks devices by unique identifiers that are stored in persistent browser cookies. IDs of coupled devices are stored as tuples of devices IDs in a central database.	SE
TV.S8.R3	*Application-to-application communication* Applications running on different devices need a facility to exchange information (e.g. commands and messages on application status).	*Second Screen Framework* The Second Screen Framework provides functionalities for the information exchange between web applications. Applications can send messages to applications running in the browser of certain connected devices. Applications can set listeners to receive messages from certain applications running in browsers of certain connected devices. The actual exchange of messages is handled by a message queue running on a server.	SE
		An enabler that provides a way for direct communication between devices without an intermediary internet server.	Gap

2.3 – ARD EPG

Scenario	ARD EPG	
Category/topic/context	Multi-screen TV applications	
Owner(s)/contacts	Martin Gordon (RBB), Christoph Ziegler (IRT), Oliver Pidancet (RBB), Ralf Neudel (IRT)	
Abstract	Communication between applications running in the browsers of (Hbb/ connected) TV devices and second screen devices (e. g. Tablets PC, Smart Phones) plus the automatic launch of applications.	
Detailed description	The ARD Electronic Programme Guide (EPG) is the HbbTV electronic programme guide for all ARD TV and radio channels. The scenario extends the feature set of the existing on-air HbbTV service to include second screen functionalities. Users can connect their Second Screen device with their HbbTV device. To initiate the connection process, the users select the appropriate menu item in ARD EPG. The user is notified about the success of the connection process on both devices. Having confirmed that information on the TV device, the second screen version of the ARD EPG is automatically launched on the second screen. The user can now synchronously navigate through the ARD EPG application. Wherever the user moves to on the one device, the application on the other device automatically follows. So the user can apply his second screen device as an enhanced remote control. Furthermore, the user has the possibility of hiding the application on the TV screen by clicking the appropriate menu item in the ARD EPG application on the second screen. The connection between the devices is persistent. When the user leaves the ARD EPG application on one or both of the devices or switches one or both of the devices off, the connection can still be used whenever the user returns to the ARD EPG without needing to repeat the connection process.	
Justification for inclusion of scenario	Audience/cultural criteria	• Provides an easier way to navigate through the EPG service. • Provides one application for all ARD TV and radio programs, • Provides combined TV guide and catch-up-service • User can begin watching catch-up program on TV, & continue on mobile

Scenario	ARD EPG	
		device
	Academic criteria	• Evaluate if/which mechanisms for connecting personal devices to TV applications are accepted • Collect further user needs to enhance existing / develop further use cases • Using 2nd screen connection for more than one application / switch from application to application • Evaluate the acceptance of second screen applications and users' concerns about privacy issues
	Commercial criteria	Increase viewer loyalty, heighten viewer awareness of engaging content delivered by ARD.

Planned experimentation

	Experimentation site	Berlin
	Estimated schedule	1st experimentation cycle
	Maturity of implementation	Lab test and field trial (second screen enabled version of ARD EPG is signalled, via DVB-T, -S and -C in Germany)
	Content, provider, availability	Existing on-air HbbTV service provided by ARD Playout Center

Functional requirements and their candidate enablers

Functional requirement		Candidate enabler	GE/SE/Gap
TV.S1.R1	*Device discovery* Is needed in the process of connecting devices. Before being able to actually assign devices to one another, they need to be aware of each other. A process for device discovery is needed in the upper scenario when the user requests the devices to connect by clicking on the appropriate menu item in the application.	*Second Screen Framework* The Second Screen Framework provides a discovery mechanism which solves the issue by means of a QR-Code which the user scans with his second screen device.	SE
		An enabler that provides a way for an automatically discovering devices based on standard web	Gap

		technologies	
TV.S1.R2	*Persistent device connection* Is needed to have a permanent knowledge of which devices belong to each other. This is crucial for being able to submit messages from a certain device to the appropriate destination.	*Second Screen Framework* The Second Screen Framework provides a device connection mechanism. It marks devices by unique identifiers that are stored in persistent browser cookies. IDs of coupled devices are stored as tuples of devices IDs in a central database.	SE
TV.S1.R3	*Application-to-application communication* Applications running on different devices need a facility to exchange information (e.g. commands and messages on application status).	*Second Screen Framework* The Second Screen Framework provides functionalities for the information exchange between web applications. Applications can send messages to applications running in the browser certain connected devices. Applications can set listeners to receive messages from certain applications running in browsers of certain connected devices. The actual exchange of messages is handled by a message queue running on a server.	SE
		An enabler that provides a way for direct communication between devices without an intermediary internet server.	Gap

2.4 – Content Linking Across Devices

Scenario	Content linking across devices	
Category/topic/context	Multi-screen TV applications, Recommendation	
Owner(s)/contacts	Michael Eble (Fraunhofer IAIS), Sebastian Tschöpel (Fraunhofer IAIS), Rolf Bardeli (Fraunhofer IAIS)	
Abstract	This scenario requires a service that synchronises matching content for Second Screen devices. It has to analyse an incoming audio signal (e. g. from a TV or a VoD stream), compute a fingerprint and check that fingerprint against a database potentially containing matching content. Finally, the service should return matching content either as links to a repository or as the content itself. The service can be implemented into Android-based applications, for example.	
Detailed description	This scenario aims at SMEs which need to link content across multiple devices like TV/computer screens and mobile devices. SMEs can integrate the service into their applications and use the technologies on their fictional, factual or advertising content. For example, one might think of a car manufacturer that wants to promote its new sports car via classical TV spots but also via corresponding content on mobile devices. The company's advertising agency creates a campaign based on video clips for TV and a mobile application with features like "Win a test drive", "Find a dealer near you" and "Explore the car's cockpit on your tablet device". One then has the chance to win an exclusive test drive if one pushes the mobile application's "win button" during air time of the TV commercial. Therefore, the service records the TV's audio signal via the mobile device's microphone, computes a fingerprint and triggers corresponding events. Another example is a broadcaster's need to synchronize first and second screen based on content and to recommend matching content for his current program: One might think of a fictional serial featuring a main character like Indiana Jones and his adventures around the globe. The second screen offers additional information like a map, the adventurer's current position and possible threats around him. The broadcaster's aim is to increase the viewer's immersion and the reach of the program.	
Justification for inclusion of scenario	Audience/cultural criteria	• Content linking across devices works independently of the given material since the material does not have to

Scenario	Content linking across devices	
		contain any watermarks. Instead, the fingerprinting is computed based on the audio signal. Hence, it is applicable to a wide range of content (e. g. material from culture and media archives). • Synchronization which relies on the audio signal is a robust approach and thus offers the user a direct way to link devices and content with high ease of use. • The user is able to keep watching content on the first screen while having access to content from different sources (e. g. web) at his fingertip on the second screen. Thus, his or her immersion into a story can increase.
	Academic criteria	There are several interesting and relevant research and development questions associated with this scenario: • What kind of interaction patterns do evolve during the use of second screen applications and how can they be designed with a high ease of use? • How can one achieve an optimal fit in terms of storytelling between the content on the first and on the second screen? • How can one scale the underlying infrastructure and algorithms to build performant distributed systems?
	Commercial criteria	There are several possible applications, e. g. synchronisation with advertising content to implement response elements into TV commercials: For example, if an e-commerce company markets their products via TV commercials and uses a tandem spot, the user could be rewarded for watching the spot if he or she "checks in" into the commercial. Thus, the user interaction can be measured.

Scenario		Content linking across devices
Planned experimentation		
	Experimentation site	Service will be accessible via Web (GUI and API) and can be tested at any location
	Estimated schedule	Continuous feedback and integration via web and meetings
	Maturity of implementation	Productive Prototype
	Content, provider, availability	Preferable: Professional generated (editorial) content in German

Functional requirements and their candidate enablers		
Functional requirement	*Candidate enabler*	*GE/SE/Gap*
TV.S2.R1 *Pre-process audio/video data* …is needed to build a fingerprint index for audio-visual media archives. This index will be used for the matching process.	*Audio Fingerprinting*	SE
TV.S2.R2 *Compute Fingerprint* …is needed to create a unique token for the given audio content, or for the extracted features to be more precisely. These features shall be used to build a fingerprint which is the basis for the subsequent content identification.	*Audio Fingerprinting*	SE
TV.S2.R3 *Identify matching content* …is needed to finally lookup and return matching content from media repositories. It is necessary to return either links or the content itself.		
TV.S2.R4 *User management capabilities* …are needed to run a multi-tenant system.	*Identity Management*	GE
TV.S2.R5 *Data Storage with ease of use* …is needed to store audio/video data as well as metadata reliable.	*Cloud Object Storage*	GE

2.5 – Audio/Video Search Engine Optimisation (SEO)

Scenario	Audio/Video Search Engine Optimisation (SEO)	
Category/topic/context	Recommendation, Search Engine Optimisation, Increase Reach	
Owner(s)/contacts	Michael Eble (Fraunhofer IAIS), Sebastian Tschöpel (Fraunhofer IAIS), Rolf Bardeli (Fraunhofer IAIS)	
Abstract	This scenario requires a service that analyses a given audio/video file and returns information for search engine optimisation. Speech and speaker segmentation as well as speech recognition are performed in order to extract the spoken word as full text. Finally, the service returns the results from speech to text processing and recommendations for additional content as XML. Thus, one can integrate the machine-readable and structured content and metadata into content managements systems (CMS) etc.	
Detailed description	This scenario aims at SMEs which want to increase their content's reach in the World Wide Web. Therefore, they perform or commission different activities to optimise their content for search engines. In this context this service turns audio/video data into machine readable and searchable text data. SMEs can integrate the service into their existing tools for online marketing and content management. For example, one might think of a SME in the business of online marketing that offers consulting and development to other SMEs: Their customers have an increasing amount of audio and video content on their websites – e.g. video clips and podcasts about their products or interviews with their Managing Director for corporate TV. They want to make use of that content and make it findable by Google etc. as well as they want to recommend additional content. Therefore, the online marketing agency uses the Audio/Video SEO service to automatically extract keywords from the SME's content and to generate tag clouds for example.	
Justification for inclusion of scenario	Audience/cultural criteria	From the audience's perspective, it becomes more and more essential to make audio/video content findable via search engines: The users want to stop searching just for metadata and manually added information, but start finding content based on the spoken word and the actual content. Thus, it is important

Scenario	Audio/Video Search Engine Optimisation (SEO)	
		to have the right tools in place to access content of media and cultural organisations as well as of SMEs in the upcoming audio/visual age. So, Audio/Video SEO is an important scenario to support these requirements.
	Academic criteria	It is of interest how search engines and audio/video content can be leveraged to create better search results and to optimise user experience when looking for video content.
	Commercial criteria	If at least to some degree businesses rely on online channels to advertise and sell their products and services, the positions (rankings) in search results are crucial. Therefore, for those companies it is important to offer web sites and content which is easily findable. That applies for textual content as well as for audio–visual content. So, with an increasing use of audio/video content it becomes more and more important for businesses to expose this content to users and search engines in a proper way.

Planned experimentation

	Experimentation site	Service will be accessible via Web (GUI and API) and can be tested at any location
	Estimated schedule	Continuous feedback and integration via web and meetings
	Maturity of implementation	Productive Prototype
	Content, provider, availability	Preferable: Professional generated (editorial) content in German

Functional requirements and their candidate enablers

Functional requirement		Candidate enabler	GE/SE/Gap
TV.S3.R1	**Process audio signal** …is needed to convert incoming audio signals into text data and to extract metadata. Therefore, it is necessary to clean the audio data and to perform	*Audio Mining*	SE

Scenario	Audio/Video Search Engine Optimisation (SEO)		
	structural and content analysis. Returns results as XML data for example.		
TV.S3.R2	*Create search-optimised content* The service has to return media assets which are aligned with information on speakers, topics, keywords, spoken words and timestamps.	*Content Optimisation*	SE
TV.S3.R3	*Generate tag cloud* The service has to create a tag cloud for further usage based on spoken words in audio visual content.		
TV.S3.R4	*User management capabilities* ...are needed to run a multi-tenant system.	*Identity Management*	GE
TV.S3.R5	*Data Storage with ease of use* ...is needed to store audio/video data as well as metadata reliable.	*Cloud Object Storage*	GE

2.6 – Activity Data and Cross-Device Resume Play

Scenario	Activity Data and Cross-Device Resume Play
Category/topic/context	Personal (Activity) Data and Cross-Device Resume Play
Owner(s)/contacts	Theo Jones (BBC), Libby Miller (BBC), Nicholas Race (Lancaster), Mu Mu (Lancaster)
Abstract	An application which shows users their activity data as a means to help them manage their cross-device media consumption.
Detailed description	Our research has shown that their own activity data does not interest users in itself: we evaluated activity data visualisation with users in FI-Content 1 and the results were that people saw no particular benefit in visualising it and editing it. Therefore our follow-up research question in FI-Content 2 is: can we abstract away from the detail of the data and use it to present something useful back to people? The initial application we have chosen is a cross-device feature of the University of Lancaster Vision IPTV system which allows users to view their history of watching TV programmes on multiple devices, and to resume play from the point they stopped watching.

Scenario	Activity Data and Cross-Device Resume Play	
	Although we plan to implement it on this system, the research will be applicable to other systems. The envisioned scenario is that users may be able to watch only part of a programme on their laptop or desktop computer at home, and may want to resume play later on a different device, for example in periods of dead time while queuing or waiting. Users can log in to the IPTV system on desktop, laptop, smart phone or tablet and view their TV [and radio] history including any programmes part-watched [and flagged for resume viewing], regardless of which device they last watched on. They can then resume play from the point at which they stopped viewing, [or from any other point]. Suitable metadata will be made available to the user about programmes displayed in this way so they can quickly identify what to watch [or listen to]. [The users will be able to delete items from their history].	
Justification for inclusion of scenario	Audience/cultural criteria	Audiences now have several devices on which they are able consume content; whether they are at home or on the move. Being able to resume play from the point they stopped watching (regardless of content origin or device) is potentially a valuable user feature. Allowing users to manage their viewing in this way is an interesting starting point on the way to other more personalized viewing and planning features.
	Academic criteria	Our initial research in phase 1 indicated that users found no particular benefit in visualising it and editing their activity data. We are interested to know if users find an abstracted view of that data useful when it is manifest in features such as resume play. Understanding which content users resume, how they manage these activity lists and patterns around the devices they resume play on are all interesting research questions. Making this work across broadcasters and device

Scenario	Activity Data and Cross–Device Resume Play	
	Commercial criteria	Broadcasters are collecting large amounts of user activity data from across their services. Understanding how to make use of this in a way that is appealing to users is important. Whilst there is potentially not (strong) commercial exploitation potential in this as a standalone feature it does address a defined need identified by end users and media providers. It is likely that any commercial exploitation would be part of a larger personalized service offering.

Planned experimentation		
	Experimentation site	Lancaster
	Estimated schedule	1st experimentation cycle (October 2013 – December 2013)
	Maturity of implementation	Field trial within University Campus (circa 6k student population)
	Content, provider, availability	Existing streaming platform and VoD catalogue, main free–to–air UK TV channels

Functional requirements and their candidate enablers		
Functional requirement		*Candidate enabler*	*GE/SE/Gap/ Application*

TV.S4.R1	The system allows users to access a catalogue of on–demand content items (video on demand)	**Content Metadata Store** This enabler contains the descriptive content metadata. It allows users to discover available TV and radio programmes	Application
		Cloud Object Storage This enabler provides access to the media assets and on–demand content items See Notes 1 and 2 below	GE
TV.S4.R2	The system allows users to view live streamed TV and radio, and on–demand content, with media encoded	**Streaming** This enabler streams media content to client devices	GE

Scenario		Activity Data and Cross-Device Resume Play	
	appropriately to be compatible with client devices	See Note 1 below	
TV.S4.R3	The system allows users to access their content and viewing history through any of their devices including connected TVs	**TV Application Layer** The *TV Application Layer (TAL)* is an open source library for building applications for Connected TV devices	SE
TV.S4.R4	The system allows users to register and sign in, link their devices, and access data such as a list of items to view in a playlist	N/A	Application
TV.S4.R5	The system allows users to view a history of TV and radio content they have consumed	N/A	Application
TV.S4.R6	The system allows users to resume playback of media content on a different device to the one on which they started playback	N/A	Application

Note 1: Due to content licensing and copyright restrictions, the content must be hosted on either ULANC or BBC infrastructure. We therefore can only use a XIFI-provided Cloud Object Storage GE or Streaming GE if these can be deployed on an infrastructure we control.

Note 2: Due to restrictions that apply to the storage, use of and access to personal data, any personal data used by the system must be held within an infrastructure we control.

2.7 – Connected Encyclopaedia for Social TV

Scenario	Connected encyclopaedia for Social TV
Category/topic/context	Multi-screen TV applications, Multimedia Mash up, Recommendation
Owner(s)/contacts	Michael Eble (Fraunhofer IAIS), Timm Kissels (Fraunhofer IAIS), Sebastian Kirch (Fraunhofer IAIS), Jochen Schon (Fraunhofer IAIS)
Abstract	This scenario required a bundle of analysis and mash-up services which support the creation of connected encyclopaedias for Social TV use cases. First, keywords and full text fragments from audio/video content are needed as well as categories for the

	encyclopaedia. Secondly, additional content from external sources (e. g. linked open data) needs to be integrated and harmonised. Therefore, speech recognition, content analytics and linking have to be performed.
Detailed description	The scenarios aims at SMEs which want to build second screen applications specifically for TV documentaries, educational formats, serial formats etc. Its starting point is audio-visual content such as a documentary series about several countries across Europe. In order to offer the viewers/users a greater experience and optional ways to dive into each country's history, specialities and traditions, various data sources are mashed up. The users receive content-based recommendations. Therefore, SMEs need to semi-automatically integrate and harmonise content from multimedia sources and to build rich experiences for Social TV formats. SMEs could use the proposed services to build such an encyclopaedia as a second screen application for Social Connected TV scenarios.

Justification for inclusion of scenario	Audience/cultural criteria	Audiences want to have additional and related information at their fingertips while they are watching video content. Therefore, an encyclopaedia using video content is as a starting point to use additional content based on automatically generated metadata (text to speech, named entity recognition and linking).
	Academic criteria	It is of significant interest in research and development how to integrate and harmonise content (data and metadata) from disperse sources in a convenient and reliable way while meeting good performance. This includes unsolved questions regarding multimedia indexing as well as linked data integration.
	Commercial criteria	Media companies are actively looking for new products they can offer in addition to existing TV shows, documentaries etc. A central aspect in the respective business models is to offer application for smart phones and tablets. Thus, they are able to increase their reach. The

Scenario		Connected encyclopaedia for Social TV
		scenario takes these perspectives into account and aims at offering services that support the creation of such additional applications.

Planned experimentation

	Experimentation site	Service will be accessible via Web (GUI and API) and can be tested at any location
	Estimated schedule	Continuous feedback and integration via web and meetings
	Maturity of implementation	Early Prototype
	Content, provider, availability	Textual content the user provides

Functional requirements and their candidate enablers

	Functional requirement	*Candidate enabler*	*GE/SE/Gap*
TV.S5.R1	*Process audio signal* …is needed to convert incoming audio signals into text data and to extract metadata. Therefore, it is necessary to clean the audio data and to perform structural and content analysis. Returns results as XML data for example.	*Audio Mining*	SE
TV.S5.R2	*Process textual data* …(individual keywords and whole phrases) both structured and unstructured form	*Content Optimisation*	SE
TV.S5.R3	*Perform Named Entity Recognition* …and Entity Linking for German, English, French, Spanish	*Semantic Annotation* *Content Optimisation*	GE SE
TV.S5.R4	*Integrate and harmonize external data sources* …to add contextual information to analysed content	*Semantic Annotation* *Content Optimisation*	GE SE
TV.S5.R5	*User management capabilities* …are needed to run a multi-tenant system.	*Identity Management*	GE
TV.S5.R6	*Data Storage with ease of use* …is needed to store audio/video data as well as metadata reliable.	*Cloud Object Storage*	GE

2.8 – Search & Discovery

Scenario	Search & Discovery application in a synchronised connected TV environment with a second screen	
Category/topic/context	Search & Discovery Applications	
Owner(s)/contacts	Nathalie Cabel, Thierry Filoche (TTRD)	
Abstract	One or several applications helping users to browse VoD catalogues, search and discover new content in innovative ways.	
Detailed description	Today, searching for interesting content to watch is time-consuming for the majority of commercial VoD offers. This scenario intends to explore several ways to explore, search and discover new interesting content for users. For first experimentations, three applications will be offered to users, on a tablet: • An advanced search, with auto-completion • A discovery function based on common criteria of several movies. Starting from a movie which a user likes, he will be able to navigation inside a graph to discover other movies with similar criteria, such as same actors, same director, etc. • A discovery function based on location similarity (movies in a same area) or temporal similarity (movies whose action is set in a similar time period) After VoD selection on tablet, user will be able to watch VoD on TV.	
Justification for inclusion of scenario	Audience/cultural criteria	• As more and more people are using or are eager to use a tablet as a second screen, this scenario addresses a large part of the population • Users can explore the VoD catalog in many different ways • Users can easily interact with the application thanks to the tactile screen • Users can use application without disturbing other people watching TV screen • Users should have some interest in the offer as the proposed VoD catalog(s) is (are) commercial VoD catalog
	Academic criteria	This scenario proposes innovative ways to discover new content that are interesting

Scenario	Search & Discovery application in a synchronised connected TV environment with a second screen
	to evaluate : • Evaluate which discover application(s) is (are) the more accepted • Collect potential expectations from users regarding movie discover • Evaluate the mechanism to pair tablet and TV Evaluate relevance of each discovery application regarding the available content
Commercial criteria	Due to the large target group of users and the innovative and easy ways to discover new content, this scenario should improve VoD consumption. Indeed, the current commercial VoD technology offers lists of movies with basic search capabilities and limited ways to filter content, such as criteria to access latest releases, using the classification by genres or the most viewed. The Applications proposed in FI-CONTENT 2 offers new ways to consume VoD. The experimentation using commercial VoD offer will give us valuable information on business interest of proposed applications.

Planned experimentation

	Experimentation site	ILB – Rennes, Lannion
	Estimated schedule	1st experimentation cycle (December 2013 – March 2014) 2nd experimentation cycle (November – December 2014)
	Maturity of implementation	Field trial with ILB imaginers
	Content, provider, availability	Existing VoD catalogue
	Experimentation site	PIX – Cologne
	Estimated schedule	2nd experimentation cycle (November – December 2014)

Scenario		Search & Discovery application in a synchronised connected TV environment with a second screen	
	Maturity of implementation	Field trials	
	Content, provider, availability	Existing VoD catalogue	
Functional requirements and their candidate enablers			
Functional requirement		*Candidate enabler*	*GE/SE/Gap*
TV.S9.R1	*Device Management :* The service needs to associate a TV with a tablet in order to select the content on the tablet and play it on the TV.	*Devices Manager framework* : this framework provides a way to associate user's tablet with user's TV and to ensure that selected content will be played on the target device.	Application
TV.S9.R2	*User Authentication:* In order to guaranty privacy for the experimentation, user will log thanks to a user identifier provided by the experimentation site owner. The social connected TV platform has no knowledge of the true identity of the user, but will ensure the secure connection for a couple (user identifier, password).	*Identity Manager framework* : this framework provides a way to authenticate user on the backend and to guaranty tokens management for VOD purchase	Application
		Identity Manager – One IDM: Different authentication mechanisms are offered by the Identity Generic Enabler. It supports standardized interfaces as well as proprietary once.	GE

2.9 – State & Quote on Social TV

Scenario	State & Quote on Social TV
Category/topic/context	Social Media, Content Linking, Increase Reach
Owner(s)/contacts	Michael Eble (Fraunhofer IAIS), Sebastian Tschöpel (Fraunhofer IAIS), Rolf Bardeli (Fraunhofer IAIS)
Abstract	The scenario requires a service that performs speech and speaker segmentation as well as speech recognition on a given audio/video file and it identifies the statements made by a

Scenario	State & Quote on Social TV	
	politician in an interview, for example. Afterwards, it returns identifiers for each statement so one can refer to this statement via an URL on Social Media platforms like Twitter or Facebook. Secondly, the service provides a search interface which can be utilized by the SME or directly used by the end users.	
Detailed description	This scenario aims at SMEs which want to increase their content's reach on Social Media platforms and to offer the possibility of statement-based follow up communication. SMEs can integrate the service into their existing content management systems. For example, one might think of a broadcaster or publishing house that aims to foster the spread of content and the follow-up communication related to this content. The editorial staff wants to make specific and controversial statements of politicians, celebrities and athletes accessible and shareable in a more convenient way by an URL that points to a specific time code in a certain video. By this means users can share the URL to quote the speaker and to tie comments and other artefacts of follow-up communication to the statement. As a result the SME is able to increase its distributive and communicative reach on Twitter, Facebook etc. Therefore, the service processes audio-visual content in the way described above and offers identifiers based on individual speech segments.	
Justification for inclusion of scenario	Audience/cultural criteria	For a lot of today's media users it is part of their daily routine to share and discuss what they have seen on TV with their friends and peers. This so called follow-up communication is an important reason for using Twitter or Facebook. Often, a specific statement given by a person on screen is of interest. By implementing the proposed scenario, users are able to refer to the specific statement and to directly align their comments, likes and tweets to this statement.
	Academic criteria	The scenario is of interest for media and communication studies: This discipline performs research regarding follow-up communication and is highly interested

Scenario	State & Quote on Social TV	
		in analysing the content that is subject to these interpersonal communication processes on Facebook, Twitter, etc.
	Commercial criteria	Content owners (e. g. broadcasters, publishing houses) need to increase the distributive and communicative reach of their video content on Social Media platforms like Facebook, Twitter and Google Plus. Therefore, their content has to be shareable to attract more viewers and users. The proposed scenarios addresses this business need.

Planned experimentation		
	Experimentation site	Service will be accessible via Web (GUI and API) and can be tested at any location.
	Estimated schedule	Continuous feedback and integration via web and meetings.
	Maturity of implementation	Early Prototype.
	Content, provider, availability	Preferable: professionally generated (editorial) content in German.

Functional requirements and their candidate enablers		

Functional requirement		Candidate enabler	GE/SE/Gap
TV.S10.R1	*Process audio signal* …is needed to convert incoming audio signals into text data and to extract metadata. Therefore, it is necessary to clean the audio data and to perform structural and content analysis. Returns results as XML data for example.	*Audio Mining*	SE
TV.S10.R2	*Build shareable segments* The service has to generate a URL for each and every specific segment the user selects.	*Content Optimisation*	SE
TV.S10.R3	*Create caption box* …or similar view with search interface		

2.10 – Cross-Screen Toolbox / Dashboard

Scenario	Cross-Screen Toolbox / Dashboard
Category/topic/context	Multi-screen TV applications
Owner(s)/contacts	Martin Gordon (RBB), Christoph Ziegler (IRT), Oliver Pidancet (RBB), Ralf Neudel (IRT), Robert Seeliger (FOKUS), Chris Krauss (FOKUS)
Abstract	CMS supported, modular, generic HbbTV application for interactive (live-) broadcast accompaniment with Second-/Multiscreen-Options
Detailed description	The interactive toolbox is used to create HbbTV applications on the TV screen. The cross-screen toolbox/dashboard scenario allows editors to create interactive applications for TV content that can be used on either the TV screen or a companion screen, such as a tablet PC. The user decides on which screen to use the additional content.

In a CMS an editor can design a template for the applications including layout, background colours and graphics. Then the editor chooses the functionalities to be offered for example extra information about the TV content, voting, chat, etc. Then specifies when the applications should be available, e. g. for the duration of the TV programme, for a specified time before and after a live broadcast, etc. The editor saves the template and the applications for both TV and the second screen are created. The applications are available at the times specified by the editor.

Users can connect their second screen device with their HbbTV device. To initiate the connection process, the users select the appropriate menu item in the HbbTV service. The user is notified about the success of the connection process on both devices. Having confirmed the information on the TV device, the second screen version of the HbbTV service is automatically launched on the second screen.

The user can then decide which device to use the application on or which features to use on which device.

The connection between the devices is persistent. When the user leaves the HbbTV application on one or both of the devices or switches one or both of the devices off, the connection can still be used whenever the user returns to the HbbTV service without needing to repeat the connection process. |

Scenario	Cross–Screen Toolbox / Dashboard	
Justification for inclusion of scenario	Audience/cultural criteria	**Professional Users:** The demand for preconfigured universal HbbTV-applications is increasing (on broadcaster side) due to the success of the HbbTV-standard. Increased interest in offering more interactive applications and feedback possibilities for editorial departments. **End Users:** Lower barrier for getting involved with TV program. Viewers want additional information on the live content, which could come from editorial teams or as feedback from users in the web.
	Academic criteria	An integrated system that supports HbbTV and 2nd Screen outputs and interacts with the DVB playout system as well as with different input sources such as external databases and social media streams is of great interest. These opportunities could offer different types of TV-Shows and user involvement.
	Commercial criteria	An HbbTV toolbox system as proposed above would be highly marketable as demand for HbbTV and connected 2nd Screen applications is rising.

Planned experimentation

T1.E1	Experimentation site	Berlin
	Estimated schedule	2nd experimentation cycle
	Maturity of implementation	Lab and field trial (service available via DVB-T in the area of Berlin and Brandenburg)
	Content, provider, availability	Existing on-air HbbTV service provided by rbb

Functional requirements and their candidate enablers

Functional requirement		Candidate enabler	GE/SE/Gap
TV.S6.R1	*Device discovery* Is needed in the process of connecting devices. Before being able to actually assign	*Second Screen Framework* The Second Screen Framework provides a	SE

Scenario		Cross–Screen Toolbox / Dashboard	
	devices to one another, they need to be aware of each other. A process for device discovery is needed in the upper scenario when the user requests the devices to connect by clicking on the appropriate menu item in the application.	discovery mechanism which solves the issue by means of a QR–Code which the user scans with his second screen device.	
		An enabler that provides a way for an automatically discovering devices based on standard web technologies	Gap
TV.S6.R2	*Persistent device connection* Is needed to have a permanent knowledge of which devices belong to each other. This is crucial for being able to submit messages from a certain device to the appropriate destination.	*Second Screen Framework* The Second Screen Framework provides a device connection mechanism. It marks devices by unique identifiers that are stored in persistent browser cookies. IDs of coupled devices are stored as tuples of devices IDs in a central database.	SE
TV.S6.R3	*Application–to–application communication* Applications running on different devices need a facility to exchange information (e.g. commands and messages on application status).	*Second Screen Framework* The Second Screen Framework provides functionalities for the information exchange between web applications. Applications can send messages to applications running in the browser certain connected devices. Applications can set listeners to receive messages from certain applications running in browsers of certain connected devices. The actual exchange of messages is handled by a	SE

Scenario	Cross–Screen Toolbox / Dashboard		
		message queue running on a server.	
		An enabler that provides a way for direct communication between devices without an intermediary internet server.	Gap
TV.S6.R4	*Automated HbbTV and Html generation* generic CMS based system that translates information from different sources (e.g. Databases, social media streams) to HbbTV and HTML applications for TV and 2nd Screen	*Toolbox Backend* To be developed	Gap
TV.S6.R5	*Administration tool* to change appearance of applications, ingest all necessary data, select features (modules) that should be offered to the viewer and define timeframe for signalling of the applications.	*Toolbox Admin* To be developed	Gap

3 - CONCLUSION

The above scenarios will be tested at various experimentations sites as outlined in the descriptions. The scenarios will continue to evolve, based on the feedback from the various experimentation sites in WP7 and from external expert feedback gathered in WP5. Scenarios that are not yet sufficiently mature for testing will continue to evolve and will be included in the second round of testing in FI-CONTENT 2.

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