FI-CONTENT

D5.1 - Phase 2 Implementation plan methodology

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Abstract

This document presents the methodology that FI-CONTENT set up in order to identify and qualify various test beds available to experiment the use cases described in *D2.1 Functional and technical specification of the 5 content areas.* The work has been performed using a first set of test bed candidates, in close collaboration with test bed representatives and with the INFINITY project in order to share this knowledge and to harmonize the descriptions. The result is a description of FI-CONTENT test beds with associated technology enablers. In the following period we will have to check the capacity of these test beds to support those enablers.

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Executive summary

FI-CONTENT Work Package 5 prepares Phase 2 of the PPP programme. Its objective is to identify and to define the test beds that should be used for a large pan-European experiment of FI-CONTENT use cases. This document presents the methodology set up to perform that work as well as its application on a first set of test bed candidates.

The starting point of this deliverable is the use cases described in *D2.1 Functional and technical specification of the 5 content areas* as well as a list of test beds proposed by the project.

Then this document describes the methodology used to collect the information needed to insure that the selected test beds are relevant to our use cases and are able to technically support the service requirements. In terms of technologies, the *generic* enablers coming from the FI-WARE project as well as the *specific* enablers established by FI-CONTENT are taken into account.

The user communities (residential users, professional users, young people, families) concerned by each use case are also addressed, as well as other important aspects of the test bed requirements (equipment, interconnection, QoS, latency, bandwidth, storage capacity, security, authentication etc.) and required content providers.

The work has been performed in close collaboration with test bed representatives and with the INFINITY project in order to share this knowledge and to harmonize the descriptions. The result is a description of FI-CONTENT test beds with associated technology enablers. In the following period we will have to check the capacity of these test beds to support those enablers.

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Abbreviations

AR	Augmented Reality
SN	Social Network
UI	User Interface
UGC	User Generated Content
B2B	Business to Business
PPP	Public Private Partnership
QoS	Quality Of Service
FUT	Field User Test
ICT	Information and Communication Technology
ENoLL	European Network of Living Labs
STB	Set Top Box
ADSL	Asynchronous Digital Subscriber Line
FTTH	Fibre To The Home
IPTV	Internet Protocol TV
DVB	Digital Video Broadcasting
OTT	Over The Top
VOD	Video On Demand
EPG	Electronic Program Guide
HD	High Definition
HTML	Text Markup Language
XML	eXtended Markup Language
CPU	Central Processing Unit

1 - Introduction

The final objective of WP5 is to get a clear overview of the test beds able to support the FI-CONTENT use cases and to carry the experiments planned in phase 2. This will take the form of a complete description of each test bed and the list of Future Internet PPP use cases (maybe not limited to those of FI-CONTENT) that they should be able to support.

This first deliverable of WP5 has the objective to set down the methodology that we will use to achieve that goal and provide a tentative description of those test beds.

Chapter 2 - of this document introduces the used methodology and Chapter 3 - presents the test beds identified by the project as the initial step of the methodology.

Chapter 4 - shows the liaisons established with other projects to perform the work. Chapters 5 - and 6 -are devoted to the technologies and more generally the environments required by each test bed to enable the FI-CONTENT use case experiments, leading to the tentative test bed description of chapter 7 -.

2 - Overall methodology

In this chapter we explain the methodology defined and used to identify the relevant test beds for the FI-CONTENT use cases.

Those use cases cover 5 domains: Game and virtual environments, Professionally generated content, UGC entertainment, high end B2B services, Edutainment and culture. In terms of use cases the initial input here is the set of use cases developed in WP2 for which we have studied the implementation in specific European locations able to offer a relevant user community as well as the necessary technical environment.

It is expected that all test beds will not be developed from scratch but from existing implementations, so existing test beds are another input to the work to be performed.

Finally the candidate test beds will have to be described in terms of
-most suitable locations,
-profile of the user community (as well as expected number of participants),
-equipment which are necessary to implement the use cases,
-interconnection between the sites (if multiple sites),
-technology enablers necessary to setup the services,
-specific constraints such as QoS, latency, bandwidth, storage capacity, security, authentication, …
-content providers required for each use cases.

Practically the working procedure of WP5 has been as follows:
1. identify and qualify existing test beds that would probably meet the requirements of FI-CONTENT use case experiments (this work has been performed for each FI-CONTENT use case domain)
2. identify the technical enablers needed to run each use case
3. identify the use case requirements in term of user communities and equipment
4. map this information to candidate test beds in order to identify in which test beds we will be able to run FI-CONTENT services.

Where relevant, the work has been performed at the programme level, i.e. in close collaboration with respectively, INFINITY (and other projects) for step 1 and FI-WARE (through FI-CONTENT WP3) for step 2.

Those steps are developed in the following chapters of this document.

3 - Initial FI-CONTENT identified test beds

The initial step of the process consisted in identifying test beds that would be able to run FI-CONTENT use cases. The list of those test beds is given in Table 1. That list, which strongly involves FI-CONTENT partners, has been transmitted to INFINITY.

Test bed	Location	Partners	Domain		
DisneyLand	Paris (Private)	Disney Robert SUMNER sumner@disneyresearch.com	Game & virtual environments		
Web-based Living-Lab centered around 3D-Internet	Saarbrucken (Public)	DFKI Philipp SLUSALLEK slusallek@dfki.de	Game & virtual environments		
BBC R&D's Media Network Integration Laboratory	London (Private)	BBC George WRIGHT george.wright@bbc.co.uk	Professionally generated content		
Rural Connect North West living lab	Lancaster (Private)	University of Lancaster Dr Nicholas RACE n.race@lancaster.ac.uk	Professionally generated content		
Future Application media lab	Berlin (Public)	Fraunhofer/FOKUS RBB Stefan ARBANOWSKI stefan.arbanowski@fokus.fraunhofer.de	Professionally generated content	UGC entertainment	Edutainment & culture
ImaginLab	Lannion (Public)	Orange Pierre-Yves DANET pierreyves.danet@orange.com	UGC entertainment		
Local Community cinema	Kortrijk (Private)	Barco Tom BERT Tom.Bert@barco.com	High end B2B services		
EduCult	Koln (Public)	Fraunhofer/IAIS Joachim KOEHLER Joachim.Koehler@iais.fraunhofer.de	Edutainment & culture		

Table 1: List of FI-CONTENT test beds

More detailed test bed description is available in chapter 8 - Annex : Test beds description.

4 - Liaisons

Because the preparation of Phase 2 is a programme level activity, FI-CONTENT has established specific links on that topic with the relevant projects of the FI-PPP, especially INFINITY for which concerns the identification of test bed sites, and FI-WARE (through the architecture board) for the technology oriented items. However other use case projects have also been contacted and the other European test labs have been taken into account.

4.1 - Liaison with INFINITY

The main challenge for INFINITY is to establish an approach that can quickly engage with infrastructure owners and application developers Europe-wide, building as far as possible on existing data, information, projects and programmes, to create a new, useful and valuable repository of infrastructure capability and capacity that relates need to opportunity and facilitates the creation of an international community that can collaborate to deliver the Future Internet.

For which concerns FI-CONTENT, the objective is to share its test beds description with INFINITY in order to give other Future Internet PPP projects the opportunity to use them (it is also an opportunity to check that it will be possible to run use cases from several projects).

Liaison between FI-CONTENT and INFINITY is performed within the *Coordination workgroup*.

The questionnaire established by INFINITY has been immediately answered by *ImaginLab* (a test bed addressing User Generated Content use cases, refer to section 3 -) which enabled INFINITY to polish that questionnaire. Now it will be used by other test beds.

As a consequence, *ImaginLab* has been the first one evaluated by INFINITY and now available on the webportal (http://www.fi-infinity.eu/portal/resources/marketing/shining-light-infrastructures-imaginlab).
This experience puts all the other FI-CONTENT test beds which want to be published on the INFINITY repository in a good position to fill the questionnaire. For the other "private" test beds, the questionnaire should also be filled in order to identify potential lack in their organization.

Afterwards, INFINITY should help in establishing liaison with test beds proposed by the other FI-PPP projects in order to possibly run FI-CONTENT services in conjunction with other services. Similarly, FI-CONTENT "public" test beds could offer the possibility to run services from other FI-PPP projects.

4.2 - Liaison with FI-WARE

Liaison between the FI use cases projects and FI-WARE is implemented within the *Architecture board,* whose objective is to anticipate difficulties regarding the integration of technical enablers in test bed environments.

FI-CONTENT work package 3 is in charge of defining the enablers which are needed by the domain use cases and to discuss them with FI-WARE. Some ("generic") enablers will be provided by FI-WARE which have to be studied carefully for their integration into the test beds.

The technological issues of the test beds are addressed in chapter 5 -.

4.3 - Relation with European test labs

Several organisations/fora are active in Europe; they are another information source to identify test beds that are able to support FI-CONTENT use case (refer to Figure 1).

The **European Network of Living Labs** (ENoLL) is a community of Living Labs with a sustainable strategy for enhancing innovation on a systematic basis. The overall objective is to contribute to the creation of a dynamic European innovation system. ENoLL aims to support co-creative, human-centric and user-driven research, development and innovation in order to better cater for people's needs. (http://www.openlivinglabs.eu/)

PanLab addresses the need for large-scale testing facilities in the communications area by implementing an infrastructure for federating test beds. The PanLab project uses the concept of European innovation clusters and builds on the existing test beds that are supporting scientific and technological endeavour within these clusters. The central objective of PanLab is to create a test bed federation among these regional innovation clusters in Europe. This will enable companies participating in these clusters to test new communication services and applications across Europe. The test bed federation includes four core innovation clusters and three satellite clusters. (http://www.panlab.net/)

FIRE has two related dimensions: on the one hand, promoting experimentally-driven long-term, visionary research on new paradigms and networking concepts and architectures for the future internet; and on the other hand, building large-scale experimentation facilities to support both medium- and long- term research on networks and services by gradually federating existing and new test beds for emerging or future internet technologies. (http://www.ict-fire.eu/home.html)

PlanetLab is a global research network that supports the development of new network services. Since the beginning of 2003, more than 1,000 researchers at top academic institutions and industrial research labs have used PlanetLab to develop new technologies for distributed storage, network mapping, peer-to-peer systems, distributed hash tables, and query processing. FI-CONTENT test labs could use such an infrastructure to run test between several locations. (http://www.planet-lab.org)
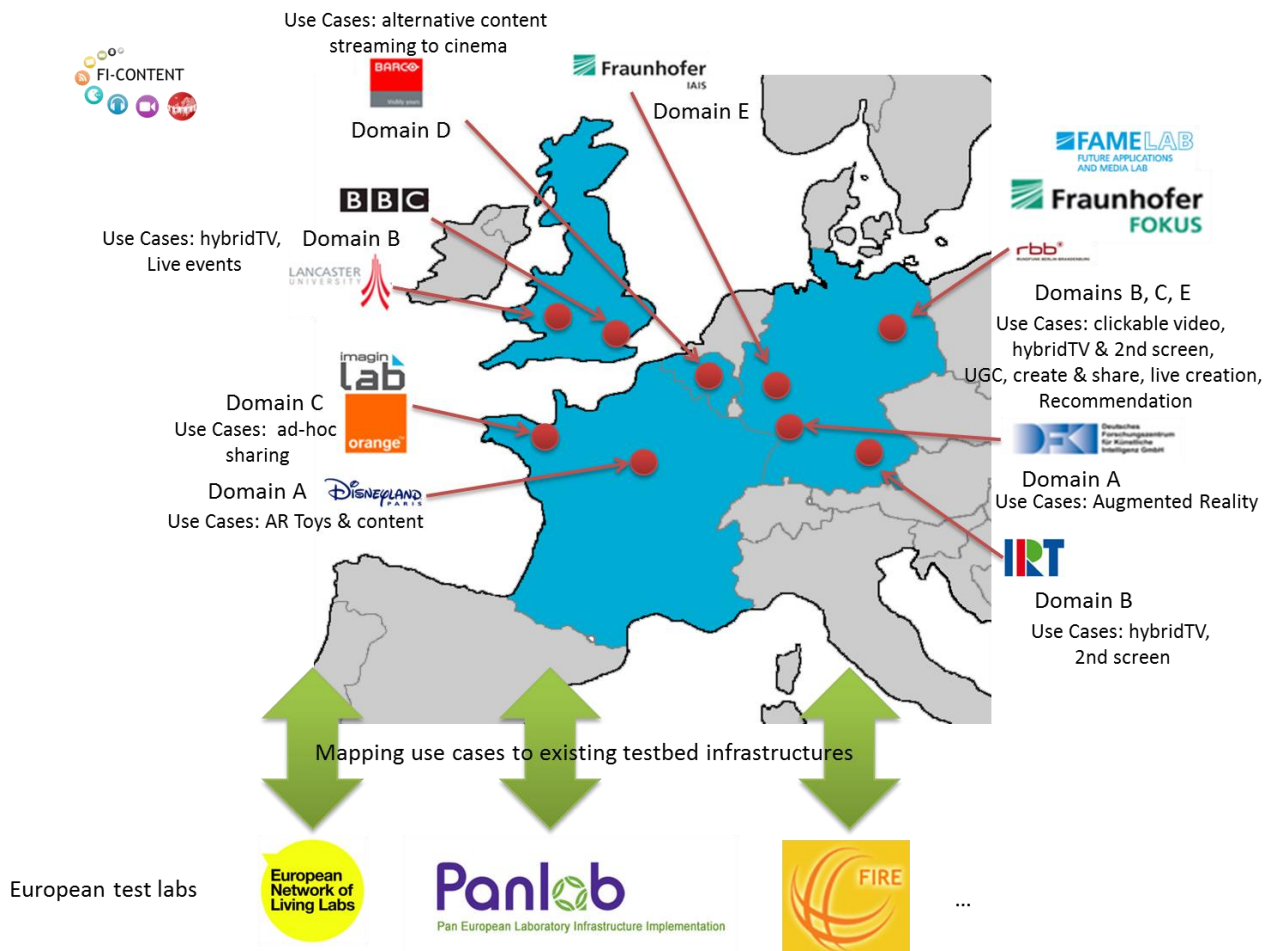
Figure 1 : European test labs

4.4 - Relation with other PPP projects

Most of the other FI-PPP projects address areas close to Machine-To-Machine applications, with intensive use of sensor networks. Although the concerned applications are different from those addressed by FI-CONTENT, that project could take advantage of the availability of data coming from networked sensors installed everywhere. This could help in providing more appropriate content to the end users by

incorporating the real-time monitoring data to enhance their traveling, gaming, working, learning and leisure experiences in real and virtual environments. Conversely the other projects might need specific content that FI-CONTENT could bring for coaching services.

FI-CONTENT has identified 4 FI-PPP projects with which liaison could be established in order to share vision but also to setup common Field User Test :

In the **Instant Mobility** vision, every journey and every transport movement is part of a fully connected and self-optimising ecosystem. Whatever the traveller's situation (office, home, on-trip…) Instant Mobility will deliver useful Future Internet enabled services. The traveller will receive personalised and real-time solutions to support him reaching his destination according to for instance real-time traffic status, public transport availability along his journey. Instant Mobility will develop sustainable transportation practices with a dedicated focus on sharing modalities of all kind of vehicles. Fleet operators' management and goods delivery monitoring are key components of Instant Mobility holistic vision of urban mobility. Instant Mobility will also provide new ways to optimize urban traffic.

> ⇨ FI-CONTENT should be able to bring content to people when they are in mobility situation

In the **FINSENY** project, key actors from the ICT and energy sectors will team-up to identify the ICT requirements of Smart Energy Systems. This will lead to the definition of new solutions and standards, verified in large scale pan-European Smart Energy trial. Project results will contribute to the emergence of sustainable Smart Energy infrastructure, based on new products and services, to the benefit of all European citizens and the environment.

> ⇨ FI-CONTENT could bring specific content to users in order to provide new coaching services helping people to save energy.

OUTSMART will establish the foundations of a Future Internet enabled ecosystem, supporting the creation of innovative services and applications with real value to European economy and citizens in five example areas most critical to our society: Water and Sewage, Street Lighting, Waste Management, Water and Environment, Sustainable Urban Transport.

> ⇨ FI-CONTENT could bring specific content to users in order to provide new coaching services helping people to decrease their environmental impact.

The **SmartAgriFood** project addresses the food and agribusiness as a use case for the Future Internet. This project will focus on three sub systems of the sector – smart farming, focussing sensors and traceability; smart agri-logistics, focusing on real-time virtualization, connectivity and logistics intelligence; and smart food awareness, focusing transparency of data and knowledge representation

> ⇨ FI-CONTENT could bring specific content to users in order to provide new coaching services helping people to eat better with less environmental impact.

However, we shall extend collaboration with other FI-PPP projects such as Envirofi where FI-CONTENT could bring specific coaching services for citizens with allergies. Envirofi could bring data (streaming video, UGC) to FI-CONTENT for travel and city guides as well as other AR Applications but also Safecity where FI-CONTENT could bring specific content to citiziens in order to provide new coaching services for safer behaviour in the city and Safecity City could provide FI-Content with real time monitoring data of the city for travel and city guides and other AR applications.

5 - Technology enablers

This chapter addresses the technological requirements for the deployment of the FI-CONTENT use cases. In the following section the technologies required by each use case domain are listed. Those technologies are classified as "Generic" when, needed for several use cases, they are planned to be delivered by FI-WARE. In the opposite case, the enablers are considered as "Specific".

Enablers	Specific (S) or Generic (G)
Context awareness and localization User 's localization information (Cell ID, Wifi zone ID, …), user's context. Extendable with augmented reality services to fuse sensor information for higher resolution localization, e.g. HD-URL.	G
Augmented Reality Services This provides a layer of application services to track and recognise images and 3D objects upon which further context aware processing may be performed to provide enriched augmentations.	G
Reality Mixer Builds upon and goes beyond common AR services to match live sensor capture with rendered virtual objects and characters seamlessly. Transparent integrations of audio, visual and physical elements are included.	S
Scalable Dynamic Spatial Database Provides tracking and management services to handle millions of moving objects with spatial location and efficient partitioning and notification of objects within participants' areas of awareness.	S
User Profile User preferences management, including consumption pattern, connections to social graphs, use of different devices, navigation habits, previously consumed content, etc.	G
Network Infrastructure Ensures low latency and high bandwidth to allow streaming high quality game assets to single and multiple end users, supporting minimum delay and jitter.	G
Security Authentication services (login/pwd or biometric), access lists (white list / black list) management, etc.	G
Content Synchronization and Publication Consistency and coherence of game content (content synchronization between all the user's devices and the user's Personal Cloud). Including synchronization of game simulation objects.	S
Content Storage, Access and Management Provides people with a Personal Cloud infrastructure enabling persistence and integrity of their content and an ubiquitous access of their content	G
3D Internet Services Provides 3D display and content processing features to ubiquitous browser platforms. Connectivity between browser instances and device input/sensor processing services are also provided as part of Xml3D standard.	G
Streaming Ensures streaming of game asset content to users and spatial database stream access.	S
Payments Ensures secure, reliable transfer of wealth from one party to another to fulfill a legal obligation caused by usage or exchange of digital assets or services.	S

Table 2: Domain A : Game & virtual environments

Enablers	(S) or (G)

Enabler	Specific (S) or Generic (G)
Content Repository and Metadata Storing and indexing of all content types with unique global identifier for each item, including real-time verification of incoming content. Consistent and unambiguous identification of contents is required. Metadata model and management and definition of contextual content delivery and applications.	S
Content Protection and Provenance Capability to identify the media/file's provenance – both the content creator and associated access permissions and rules as well as content protection and digital rights management restrictions.	S / G (discussed with FI-WARE)
Content Transcoding, Adaptation, and Lifecycle Transparent service and content creation, adaptation and transcoding from multiple sources with support for usage situation definition and 3D video also including lifecycle management of services, applications and content, including synchronized delivery to multiple users at different locations.	S
Streaming Ensures streaming of real-time or VOD content to users. Content can be an aggregation of multiple synchronized views and audio streams.	S
Network Infrastructure Ensures high bandwidth to allow streaming high quality/multiview to single and multiple end users, ensuring quality of service with minimum delay and jitter. The infrastructure should include a Content Delivery Network, and multicast should be used to reduce the load on the network.	G
Device Management Provides services with information about presence, capabilities, connectivity and location of consumer devices (cameras, PCs, cell phones, STBs, tablets), and unambiguous mapping to users and their profiles.	S
User Profile Broker User preferences management , including consumption pattern, connections to social graphs, use of different devices, navigation habits, previously consumed content, etc.	S
Recommendation Services Content recommendations, based on the user group constellation, context (such as available devices, network connection, situation etc), user profiles, etc.	S / G (discussed with FI-WARE)
User Activity Monitoring Allows 2 or more users' interactions of what is exchanged (Documents, Messages, Video, Interest...), and of the way it is exchanged (Mail, Chat, Social Networks...) through a generic access. User interaction can be synchronous (e.g. audio/video conference, chat) and asynchronous (e.g. Instant Messaging, Mail).	S
Payments Ensures secure, reliable transfer of wealth from one party to another to fulfill a legal obligation caused by usage or exchange of digital assets or services.	S
Secure Authorization for Data Exchange Allows the user to grant and control access to their personal data to services with which the user wants to share data. The user should be able to control which services have access to their data based categories, such as type and origin of data.	S
Security Services related to control access to networks and services. The handling of credentials/certificates is needed to be able to access applications and content in the same framework of tied applications (single sign-on) in a single content service session. Trust and recommendation should be used in order to allow invited users to access content seamlessly.	G

Table 3: Domain B : Professionally generated content

Enablers	Specific (S) or Generic (G)
Context awareness and localization User 's localization information (Cell ID, Wifi zone ID, …), user's context	G
Multimedia Indexing and image/speech recognition Facilitates automatic analysis of any multimedia content (text, audio, image, video) in order to categorize it and allow a better retrieving of it for enrichment purpose. Generation of metadata	S / G (discussed with FI-WARE)
Content Protection and Provenance Capability to identify the media/file's provenance – both the content creator and associated access permissions and rules as well as content protection and digital rights management	S / G (discussed with FI-WARE)

restrictions	
Content Enrichment Platform Allows any content and media to be enriched with supplemental information. Hereby the supplemental information can be automatically mashed (e.g. related information, social media etc.), personally created or customized	S
User Profile User preferences management , including consumption pattern, connections to social graphs, use of different devices, navigation habits, previously consumed content, etc.	G
Recommendation Services Content recommendations, based on the user group constellation, context (such as available devices, network connection, situation etc), user profiles, etc.	S / G (discussed with FI-WARE)
Security Authentication services (login/pwd or biometric), access lists (white list / black list) management, etc.	G
Content Synchronization and Publication Consistency and coherence of user's data (content synchronization between all the user's devices and the user's Personal Cloud). Provide an easy to use and rich interaction with Social Networks (content publication, deletion and update)	S
Content Storage, Access and Management Provides people with a Personal Cloud infrastructure enabling persistence and integrity of their content and an ubiquitous access of their content	G
Augmented Reality Presents content on the mobile environment	G
Content Adaptation Media transcoding, media transformation	S / G (discussed with FI-WARE)
Ad hoc Content Sharing Content sharing between a community of users, geographically close to each other, when no access to the communication infrastructure is available	S
Billing	G
Network Infrastructure Connected Device Interfacing (CDI Generic Enabler) Network Information & Control (NetIC Generic Enabler) Service, Capability, Connectivity and Control (S3C Generic Enabler)	G

Table 4: Domain C : UGC entertainment

Enablers	Specific (S) or Generic (G)
Bandwidth Reservation A cinema complex should be able to reserve a given amount of bandwidth over a given amount of time, as opposed of having to lease a line 24/7.	S / G (discussed with FI-WARE)
Network Infrastructure Network Infrastructure should ensure High bandwidth (320 Mbps per stream) to allow streaming high quality to single and multiple locations, ensuring QoS with visibly zero delay and jitter. A total number of 20 streams is to be delivered to a single cinema multiplex. Multicast can be used to reduce the load of the network. The infrastructure should include a Content Delivery Network, providing high quality content delivery with high quality user experience. For feature movies, the QoE can not be worse than with the legacy (non-streaming) solutions. Network should provide network awareness features , allowing devices and service providers' awareness of the network capabilities (e.g. kind of network, available bandwidth) in order to adapt service and QoE. This feature will be used as a fall-back solution or a more economy-friendly alternative for customers lacking the budget to reserve high bandwidths.	G
Content Protection and Provenance Capability to identify the media/file's provenance – both the content creator and associated access permissions and rules as well as content protection and digital rights management restrictions	S / G (discussed with FI-WARE)
Recommendation Services This enabler provides a service to facilitate content recommendation for the user. Recommendations will be based on the user group constellation, context (such as available devices, network connection, situation etc) as well as existing user profiles (including explicit and implicit preferences derived from usage patterns and social graph). Access to metadata describing and categorizing content is required.	S / G (discussed with FI-WARE)
Security Services related to control Access to networks and services. Dedicated subnet/tunneling between end points must be used. Additional layers of security (encryption) are to be provided as well.	G
Content Repository and Metadata Storing and indexing of all content types with unique global identifier for each item, including real-time verification of incoming content. Metadata model and management and definition of contextual content delivery and applications.	S
Streaming The receiver should be able to start, stop and pause the stream if applicable.	G
Device Management The presence, capabilities and location of devices (projectors), making up the content creation and consumption chain, allowing content to be ingested from users, uniquely addressable devices to be mapped to users and their current device usage, and signaling device capability to upstream content serving system(s).	
Payment The Payment Enabler ensures secure, reliable transfer of wealth from one party to another to fulfill a legal obligation caused by usage or exchange of digital assets or services. It should support flexible payment plans, flat rates, micro/online payments, affiliate programs, sharing of costs, reselling and/or other advanced payment concepts. The result of successful payment operations are Virtual Tickets assigned to buyers and associated to their user profile. Tickets implement the Digital Right Management restriction chosen by the service provider: tickets can be used to consume protected content or participate to virtual events. Tickets can grant access to single or multiple events/contents and/or can have an expiration date.	G

Table 5: Domain D : High end B2B services

Enablers	Specific (S) or Generic (G)
Multichannel Support: recording and distribution of videos and multimedia content in general should be possible for different channels and devices;	G
Content Synchronization: it is needed to ensure consistency and coherence of user's data and content among all user's devices and platforms (CMS, User Data Base, …).	G
AR Platform: to facilitate multimedia content consumption and user interaction on the mobile environment through innovative paradigm of augmented reality to show multimedia content superimposed on the camera view;	G
Image recognition: in conjunction with Augmented Reality technology, to allow to recognize items (objects, people, places, POIs, …) and extract meaningful information from multimedia content (image, audio, video, etc.) of any kind;	G
Semantic technologies: to enrich textual data (tags or text) with meaningful and external content; in particular Linked Open Data (LOD), is helpful in both annotating & categorizing content, but also in providing additional rich information;	G
Context Aware Platform: to support gathering, processing and retrieving of contextual data (e.g. location) related to users and content;	G
Recommendation Platform: to manage recommendation and analyses user behaviour in order to make a recommendation of an item/content that can be of his interest.	G
Content Finder/Content Enrichment: to facilitate access to the right content and digital search offering a simple instrument to find and group content about a particular subject, to refine search results based on contextual info (e.g geographical, …) and to enrich content by other content (e.g. UGC, text annotations, LOD,…).	S
Multimedia Indexing: recorded multimedia data should be analyzed (e.g. segmentation, structure, object and audio/speech recognition), indexed and XML metadata (e.g. MPEG-7) should be generated. The indexing should process video, audio, images and text data. This enabler will incorporate and leverage the functionality of machine based approaches for multimedia partitioning and indexing as well as using the meta-information generated by the content consumers for retrieval.	S
Federated Social Network: to provide social network service to the end user, guaranteeing social network federation so that users can easily communicate with users on other SNs and migrate their data	S

Table 6: Domain E : Edutainment & culture

6 - FI-CONTENT use case requirements

The objective of this chapter is to define the requirements of each use case regarding the type of expected user communities and testing environments which are needed to experiment each use case. Use cases are classified by domain.

6.1 - Description of Domain A requirements

6.1.1 - User community profile

European citizens broadly enjoy a range of interactive game and virtual environment entertainment experiences:

- Inclusive of PEGI demographic ranges, where content is applied according to sensitivity and suitability
- Parents and their children are a community with particular consideration for game producers, with varying degrees of family status.
- Students, professionals, club/association members.
- Players and guests have some familiarity with and are able to manipulate touch controls and hand held devices, but no advanced expertise or know-how is prerequisite.
- Match making according aligned level of experience from user profile data is applied.
- Internet enabled devices are present for test cases and scalability users should have access to their own platforms. Tests with high platform requirements with supply devices.
- The game tests audiences may include novice gamers and in niche groups, hard core highly engaged gamers.
- Positioning of players for collaborative, competitive, head-to-head (targeting a mass market division) and differentiation (expand audience beyond regular mass market) targeting is present in this usage area.
- Users want to achieve, gain status, share, chat, role-play, nurture, follow, and have real-world transferable gains.
- Psychographic segmentations are applied according to lifestyle and personality.

6.1.2 - Most suitable connectivity

High speed bandwidth and low latency network infrastructure services are desirable. On device caching, pre-emptive access and transmission, prediction and lag handling are present in this content area.

- IP services
    - Fast Internet connection (wired) for coordinating services
    - Fast wireless mobile internet connection for participant interaction

6.1.3 - Equipment

The equipment needed for the implementation of the use cases for close interaction tests, field tests and scalability tests is as follows:

- Players/Guests
    - Mobile advanced (video camera, sensors, retina display) capable device, e.g. tablet, mobile game device (1000€)
    - Broadband Internet connection
    - Own networked enabled personal device, e.g. PC, Laptop, Tablet, Mobile
- Hosting/Coordinating Services
    - Server PC (3000€)
    - Development PC (2000€)
    - Content PC (2000€)
    - Web-Server Infrastructure:
        - Application Server

- ▪ Web-Server
- ▪ Data Base Server
- Software development tools

6.1.4 - Content production

- Light content will be sourced and produced for test cases outside of expensive commercial content production.
- Video game and virtual environments digital content creation tools and devices.

6.1.5 - Locations
Locations covering connected individuals, player groups, and communities are to be tested. Scalability oriented community test will be performed location agnostic within an appropriate network infrastructure.

6.1.6 - Content providers
Participants, coordinating hosts and professional game content sources applied.

6.1.7 - Constraints in terms of QoS, latency, bandwidth, storage capacity, security, authentication

- Device network should support minimum of 10Mbps (100Mbps ideal) bandwidth for asset synchronisation to each participant.
- Network ping minimum of 100ms (<10ms ideal) for responsive interaction
- Device storage should permit caching of 64GB on local HDD and 1GB RAM, with much larger off device storage availability

6.1.8 - Services/network enablers necessary to set up the services and location of the platforms
The enablers, coming from FI-WARE and FI-CONTENT, necessary for setting up services and location are as follows:

- Augmented Reality Services
- 3D Internet Services
- Network Infrastructure
- Localization
- Security
- User Profile
- Storage
- Synchronisation
- Streaming

6.2 - Description of Domain B requirements

6.2.1 - User community profile
It is important to target a wide spectrum of users to represent typical European citizens:

- Cross-chapter of society (children, teenagers, adults, pensioners)
- Users living alone or shared household (families, couples, shared accommodation)
- A proportion of users involved in the trials need to be familiar and own a connected TV set or STB, smartphones, tablet or laptop
- More traditional professional content consumers (not technology savvy)
- In the case of cultural event testing, end users need to have a strong interest for some particular artistic performance area (Opera, Ballet, Theatre, etc). Target audience includes enthusiasts, performers, teachers, students, public bodies
- Individuals or institutions interested in specific niche professional contents, willing to pay for consuming such content

- Media Usage/Interests
  - Linear TV viewers
  - Catch-up TV viewers
  - Internet users
  - Social media users
  - Mobile web users
- Equipment
  - Connected TV
  - Smart phone

6.2.2 - Most suitable connectivity

Users need to be located in an area where they can receive high quality and bandwidth broadcast and IP services. Access can be limited at home, in specifically set up living labs in selected locations, and in common viewing locations.

- Broadcast services can be:
  - Terrestrial - Regional
  - Cable - National
  - Satellite – Footprint of main satellite serving national market
- IP services
  - Fast Internet connection (Fixed line)
  - Fast mobile internet connection
- The most suitable location will depend on the content being used; the following factors need to be considered:
  - The users need to be located in a geographical location covered in the content providers broadcast rights
  - The users ideally need to receive content in language of the country they live in or they speak, for example if the content is in German then the main audience should be located in a German speaking country, if it is in English then they should be located in an English speaking country, etc.
  - If the content is related to and only relevant specific geographical location or region, then the users need to be located in that region (e.g. traffic or weather information, local news and reporting, etc.)
  - If the content is event related, then the event needs to be of interest or relevance to the users to allow them and also to provide motivation to attend and participate in it (e.g. either connect from their home or from public spaces in the case of cultural or education institutions)
  - In the case of cultural events, it is needed setting up a network of European Theatres willing to cooperate allowing real-time shooting of events and possibly introduce web-based ticketing services

6.2.3 - Equipment

The equipment needed for the implementation of the use cases for trials is as follow:

At home

- Users
  - Connected TV (1000€)
  - 2nd Screen Devices: Smart phones, Tablet PCs (500€)
  - Broadband Internet connection (ADSL2+ or FTTH (in the case of IPTV or OTT infrastructure)

- o DVB-S/-C/-T/-T2 receiving
- o a Full HD Connected TV Set or a STB
- Service-Provider
  - o Head-End: DVB-Play-Out permitting HbbTV signalling (for laboratory operation 6000€)
  - o Web-Server Infrastructure:
    - Video Streaming Server (VoD) / live
    - Application Server
    - Web-Server
    - Data Base Server

Theaters / Content production companies

- Infrastructure for content acquisition (shooting, editing, directing during niche events, possibly from different shoot angles);

Internet Companies

- Infrastructure for processing and synchronizing multimedia contents;
- Enforcing DRM;
- Aggregating related contents;
- Advertising Live and VoD events
- Creating and managing a users social network;
- Recommending VoD contents and Live events;
- Live event booking;
- Ticket selling;
- Synchronized VoD content distribution to single users and groups;
- Synchronized Live content streaming;

6.2.4 - Locations
It could be challenging to spread the trial across several geo-locations and to have interconnections between use cases. Locations depend on the user groups, content and services to be tested.

6.2.5 - Content providers
- Recommendations
  - o Broadcaster/content provider with PI-data for all its programmes
  - o Broadcaster/content provider with own EPG for hybrid TVs
  - o Broadcaster/content provider with streaming services and catch-up TV
  - o Broadcaster/content provider with server capacity to deal with recommendation engine and user profiles, etc.
  - o Broadcaster/content provider with enough relevant content for location and user group
- Second screen
  - o Broadcaster/content provider with EPG for hybrid TVs
  - o Broadcaster/content provider with streaming services and catch-up TV
  - o Broadcaster/content provider with interesting content/programmes/formats that loan themselves to user interaction.
  - o Broadcaster/content provider with enough relevant content for location and user group
- Cultural events
  - o Niche Events Organizers and Libraries (Theatres, Cultural Institutes, Content Libraries, Festival organizers, Niche Sport Leagues), Owners and Creators of niche professional contents, willing to distribute them to a wider audience
  - o Content Producers: Content Production Companies, in charge of Content acquisition (shooting, editing, directing during niche events, possibly from different shoot angles)

      o   Internet Companies, as Service Providers, Platform Managers, Ticket Sellers, Content Aggregator, Content Recommenders

      o   Telco operators, as Network Providers, Service Providers, Platform Managers, Data Centres

6.2.6 - Constraints in terms of QoS, latency, bandwidth, storage capacity, security, authentication

- Bandwidth > 6Mbps for video streaming
- Low End2End-Delay for 2nd Screen remote applications
- Network Infrastructure should ensure high bandwidth (min 8 Mbps per 2D HD stream in the case of IPTV or OTT TV) to allow streaming high quality/multi-view to single and multiple end users, ensuring QoS with minimum delay and jitter
- Multi-view synchronised content sent to same user requires a maximum latency of 50ms among flows
- Multi-view synchronised content sent to multiple users requires a maximum latency of 250ms among flows

6.2.7 - Services/network enablers necessary to set up the services and location of the platforms

The enablers, coming from FI-WARE and FI-CONTENT, necessary for setting up services and location are as follows:

- Network Infrastructure
- Security
- User Profile
- Recommendation Service
- Content Repository and Metadata
- Content Protection and Provenance
- Device Management
- User Activity Monitoring
- Content Transcoding, Adaptation and Lifecycle
- Multi Audio/Video Streaming and Control
- Payment

It is possible that all the above enablers will be realized as web services provided by a web server infrastructure.

None of the enablers providing the full functionality like requested in D4.1 are available.

6.3 - Description of Domain C requirements

6.3.1 - User community profile

User Generated Content services are mainly targeted mass market users from any segment: young's, singles, family and also seniors.

Creation, management and sharing contents in the hybrid world should expect individuals and several communities or group of people,:

- Students
- Family
- Friends
- Contacts on existing social networks
- …

6.3.2 - Most suitable connectivity

Users need to be connected through high bandwidth connection (wired and/or mobile). As far as most of the UGC services are usable from a mobile, from à PC, tablet or TV, some users should have both accesses in order to test seamless service continuity between devices.

6.3.3 - Equipment

For UGC services, users should have one or several of these devices :
- Smartphone
- TV set + set top box
- WebTablet
- PC

6.3.4 - Locations

It should be interesting to have users from different European locations in order to check scalability.

6.3.5 - Content providers

Aggregation of pro contents (to identify depending on the service specifications) must be available in order to catalyze UGC activities.

6.3.6 - Constraints in terms of QoS, latency, bandwidth, storage capacity, security, authentication

The requirements from a network point of view are the following ones:

- Bandwidth > 6Mbps for video streaming
- Low End2End-Delay latency
- High authentication mechanism
- Content watermarking
- Large storage capacity
- User profile information highly secured

6.3.7 - Services/network enablers necessary to set up the services and location of the platforms

The enablers, coming from FI-WARE and FI-CONTENT, necessary for setting up services and location are as follows:
- Network Infrastructure
- Security
- User Profile
- Recommendation Service
- Content Repository and Metadata
- Content Protection and Provenance
- Device Management
- User Activity Monitoring
- Content Transcoding, Adaptation and Lifecycle
- Multi Audio/Video Streaming and Control
- Payment

6.4 - Description of Domain D requirements

6.4.1 - User community profile

B2B services target professional users, namely owners of movie theaters. The customers of these professional users range from all segments. This means a mixture of singles, couples, groups, families with an equal mixture of ages: young children, teenagers, students, adults and seniors.

6.4.2 - Most suitable connectivity

Depending on the size/budget of the cinema complex, the internet connectivity can range from leased lines to "consumer" broadband technologies such as ADSL or Cable.

6.4.3 - Equipment

B2B professional user will exclusively use dedicated media servers from which the specifications/capabilities are very well known. These media servers can be integrated into the projector (IMS or Integrated Media Server).

6.4.4 - Locations

It is proposed to test this in an actual movie theatre.

6.4.5 - Content providers

Content ranges from movies to professionally generated content (live or recorded).

6.4.6 - Constraints in terms of QoS, latency, bandwidth, storage capacity, security, authentication

The requirements from a network point of view are the following ones:

- Bandwidth > 320Mbps for video streaming
- Low End2End-Delay latency
- High authentication mechanism
- Content watermarking
- Large storage capacity
- User profile information highly secured

6.4.7 - Identification of services/network enablers necessary to set up the services and location of the platforms

The enablers, coming from FI-WARE and FI-CONTENT, necessary for setting up services and location are as follows:
- Network Infrastructure
- Bandwidth Reservation (Bandwidth on Demand)
- Security
- User Profile
- Recommendation Service
- Content Repository and Metadata
- Content Protection and Provenance
- Device Management
- User Activity Monitoring
- Streaming
- Payment

6.5 - Description of Domain E requirements

6.5.1 - User community profile

In order to activate the FI-CONTENT **use case E user community**, access to an already established regional expert panel for Education in Germany and other countries will be exploited. Thus, our **use case E user community bootstrapping activities** will be fed with all the debates and discussions which have been worked out so far, in order to build on top of their results.

In 2011 as well as in January 2012 GAR supported by Fraunhofer/IAIS organised the first regional Expert Panel meeting with the title "The sensible use of the Future Internet in Education and Culture" in Cologne, Germany with about 25 participants. It was dedicated to educational practitioners such as teachers, professors and school directors, student research lab staff and school networkers. The objectives of the first

expert panel meeting was to bootstrap a regional educational open-innovation ecosystem and user community to co-create and test novel learning scenarios and applications for the Future Internet and to establish focus groups and test labs of learners and teachers in interested schools and organisations.

As next steps, this regional Expert Panel and learners and teachers focus groups will connect itself over the web with other European schools and universities through their active involvement in the web based European School Network called Etwinning (http://www.etwinning.net, including more than 145.000 Schools) and the international Opencast community (http://opencast.org, a growing worldwide university network) to exchange ideas about novel learning scenarios in the Future Internet and to participate in the future FI-Content experiments. This German panel constitutes the preliminary inspiration for the creation of the Pan-European FI-CONTENT **use case E user community for the EduCult testbed described in Section 8.5 .**

In Italy, Telecom Italia is also in touch with some high schools to discuss their involvement in the phase 2 experiments of the Future Internet use case E. In general it has been noticed a good interest from schools in experimenting and using new instruments and technologies from the Future Internet as support for education. But the process to formally involve them is still on-going.

The web based user community for the EduCult testbed exits of cultural and educational professional experts as well as project groups of students in the age range from 14 to 28 years old of secondary schools as well as from universities.

6.5.2 - Most suitable connectivity

Ideally the web based user community for the EduCult test bed is open for all interested educational and cultural interested organizations and citizens. The users need to be connected through high bandwidth connection (wired and/or mobile).

6.5.3 - Equipment

Any user participating in our experiments should have access with any device she/he possess (mobile, smartphone, tablet, PC etc) to the web-based community. For experiments around a local live event such as Carnival of Culture in Berlin or Carnival in Cologne or other live events in Italy or any other European town, we wish to equip all the participants with smart mobile devices (who do not yet posses those devices) and we need an extra budget for this equipment. We imagine to start with our test group of around 50 local students participating at the live experiment in Berlin/Cologne (or other locations, whom we wish to equip with smartphones/tablets devices) and with 1000 participating remote Students and Experts over the web from any place with any device they already posses

6.5.4 - Locations

The experiment around live local cultural events such Carnival of Culture will take place in Berlin and we imagine also other cultural events such as Carnival, Open Night of Theatres, Music or Art Galleries in Cologne, Turin or in other towns with the participation of our Pan-European web based user community.

6.5.5 - Content providers

The required content for this use case should come from the following content providers:

1. User community: The users of the test platform will generate content by producing pictures and video clips using the cameras of their mobile devices. The students will take images of and film the cultural events and edit their own multimedia journals..
2. German Digital Library/Europeana: The cultural platform contains millions of digital media items and objects. For the preparation of the event the student can search and navigate in this cultural portals and access content (text, images, videos, sound) in an almost unlimited way. The content is already under a user friendly (e.g. creative common license) license model which allows the usage of this content for non commercial scenarios.
3. OpenCast: The OpenCast platform contains already yet thousands of video lectures covering almost any kind of content areas (science, culture, languages, etc.). This enormous content source is indexed and catalogued by central services of OpenCast.

4. Broadcast archives: RBB and BBC have huge audio-visual archives containing videos and films. This archive material can be indexed and reused for the suggested scenario.

6.5.6 - Constraints in terms of QoS, latency, bandwidth, storage capacity, security, authentication

For the realization of this use case the following requirements are foreseen:

-   Network Infrastructure: see FI-Content_WP3-002_V1.0 document. Network Infrastructure should ensure High bandwidth (TBD) to allow e.g. streaming high quality/multiview to single and multiple end users, ensuring QoS with minimum delay and jitter, enable 3D object view/access, ….
-   Multichannel Support: see FI-Content_WP3-002_V1.0 document. The recording and distribution of videos and multimedia content in general should be possible for different channels and devices.
-   Content Synchronization: see FI-Content_WP3-002_V1.0 document. It is needed to ensure consistency and coherence of user's data and content among all user's devices and platforms (CMS, User Data Base, …).
-   AR Platform: to facilitate multimedia content consumption and user interaction on the mobile environment through innovative paradigm of augmented reality to show multimedia content superimposed on the camera view;
-   Image recognition: in conjunction with Augmented Reality technology, to allow to recognize items (objects, people, places, POIs, …) and extract meaningful information from multimedia content (image, audio, video, etc.) of any kind;
-   Semantic technologies: to enrich textual data (tags or text) with meaningful and external content; in particular Linked Open Data (LOD), is helpful in both annotating & categorizing content, but also in providing additional rich information;
-   Context Aware Platform: to support gathering, processing and retrieving of contextual data (e.g. location) related to users and content;
-   Recommendation Platform: to manage recommendation and analyses user behavior in order to make a recommendation of an item/content that can be of his interest.

6.5.7 - Services/network enablers necessary to set up the services and location of the platforms

Figure 2 (Architectural overview for Content Area E) depicts a high level overview of a FI-Content architecture assembled with generic enablers from the core platform plus specific enablers identified for Content Area E.

The specified enablers can support the development of new services for the Future Internet related to Edutainment & Culture Content Area and some of the enabler needed to follow steps identified in the above paragraph.

These functional enablers have been identified from use case on Content Area E partners and by participants from the student users' focus group (work in progress) that have been conducted until now (for details, please refer to FI-CONTENT_WP2-001_D2.1 V1.0).

This overview is based on architecture descriptions found in the FI-WARE Core specifications[1].

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[1] http://forge.fi-ware.eu/plugins/mediawiki/wiki/fiware/index.php/FI-WARE_Product_Vision
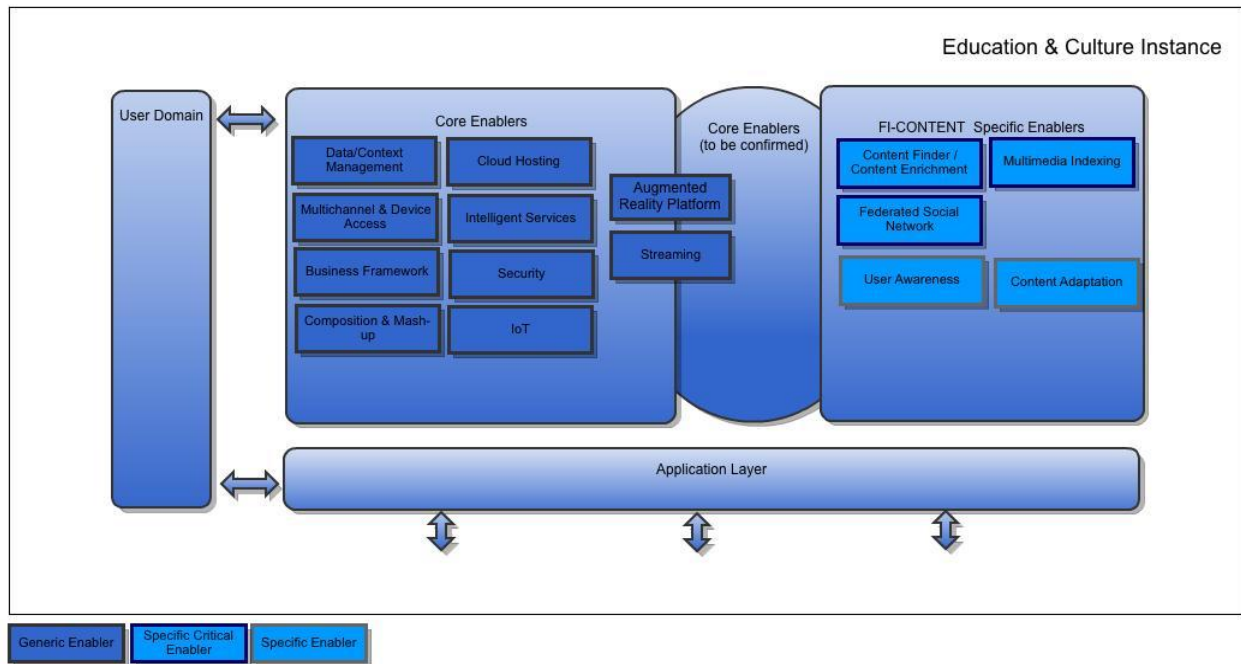
Figure 2: Architectural overview for Content Area E (education and culture)

Parts of this Specific (or Generic) Enablers have been described in FI-Content_WP3-002_V1.0 and FI-CONTENT_WP4-002_D4.1 V1.0.

Content Finder/Content Enrichment
This enabler provides capabilities to facilitate access to the right content and digital search offering a simple instrument to find and group content about a particular subject, to refine search results based on contextual info (e.g geographical, …) and to enrich content by other content (e.g. UGC, text annotations, LOD,…).
The two main functionalities exposed are then:

- Content discovery (exposed by the Content Finder component of the enabler): this functionality allows to search multimedia content (text, images, video) over several sources (web, social networks, digital archives, controlled data repositories) based on the user input (text). The search process can also be improved by using semantic technologies exploiting Linked Open Data and text-analysis techniques that help students in a more effective retrieval of additional information.
- Content Creation & Enrichment (exposed by the Content Enrichment component of the enabler): after the content discovery has taken place, a personal report can be created concerning each topic searched by allowing users to explore the result retrieved. An automatic summary of the page results is shown, dragging and dropping these result snippets on a workbench it is allowed to build and save their own report. The personal report can be edited and enriched (mix and integrate the personal report with multimedia user generated content or other personal reports, annotation and collaborative editing), then user can export it, creating this way a social multimedia journal, which will be further enriched by means of user-generated multimedia annotations. Finally, both report building and reading (presentation) should be cross-platform (e.g. mobile/tablet, pc).

Multimedia Indexing
Multimedia objects (audio/video mash ups, 3D data, augmented reality, etc.) are getting more and more important for today's Web users. It is expected for the upcoming years that the importance of multimedia based content keeps growing on a daily basis. Besides changing user expectations related to the consumption of this kind of material one can also rely on increased technical capabilities of our daily used equipment to handle even more information at the same time.
Allowing users to easily identify portions of multimedia data that contains certain piece information is complicated taking the time-based nature of multimedia objects into account where the important fragment might be hidden in time. Knowing upfront what content is contained within a multimedia object can go a long way toward connecting the user with the information they are seeking. Besides machine algorithm approaches for segmenting and tailoring multimedia constructs (e.g. speech to text, scene and object

detection) one also finds alternative approaches that fully rely on users interaction. Social navigation is an emerging trend for enhancing multimedia material such as educational web lectures. With social navigation, users can be guided through collections of material by following other users' traces. This user generated meta-information can be visualized and aggregated actions taken from other users past interactions can be used for navigation purposes or information retrieval.

This enabler will incorporate and leverage the functionality of machine based approaches for multimedia partitioning and indexing as well as using the meta-information generated by the content consumers for retrieval.

Federated Social Network

This enabler is responsible of providing social network service to the end user, guaranteeing social network federation so that users can easily communicate with users on other SNs and migrate their data.

It provides management features for user accounts, relationships and user activities & follow-up actions and the related access to this data to third party applications based on user permissions. It can also include an optional gateway functionality responsible for interacting with other SNs that enables users to interconnect with external SNs on which they already have an account (e.g. Facebook, Twitter) using the proprietary interfaces of such social networks. Three main modules can be considered as part of this enabler:

- Intra-SN server module is mainly providing functional and management features of the SN service such as user account, profiles and relationships management, authentication and authorization, post, update and delete activities & follow-up actions. It also exposes network-side APIs to 3rd party applications in order to exchange social network service information requested by these applications.

- Inter-SN server module is mainly responsible for the federation among SNs. It enables the activities, follow-up actions and media exchange between different federated SNs.

- Client module that enables the user to connect to the SN service and interact with users on the same or other federated SNs, or on external SNs (if the gateway function is provided). Furthermore it offers caching functionalities to temporarily queue information prior to send it to the intra-SN module, for example to defer the request until back online (in case of server or connectivity problems) or for throttling purposes (e.g. regulate bandwidth over the air). It also exposes device-side APIs to 3rd party device applications in order to exchange social network service information requested by these applications

7 - Conclusion and synthesis

In this document we have defined and applied a methodology to define the test beds to be used in phase 2 to experiment the FI-CONTENT use cases. The technological constraints and the use case requirements have been listed for each use case domain. An initial definition of the test beds has been provided.

Table 7 is an attempt to synthesise the information collected in the previous chapters and to map the technology enablers against each FI-CONTENT test bed. In the next period we will have to check the capacity of these test beds to support those enablers.

Test bed name	Location	Use cases supported	Generic enablers	Specific enablers
Disney Land Paris	Paris	Augmented Reality Toy (ARToy)	Context awareness and localisation Augmented Reality Services User profil Network Infrastructure Security Content Storage management 3D internet services	Reality Mixer Scalable Dynamic Spatial Database Content synchronization and publication Streaming Payments
Web-based Living-Lab centered around 3D-Internet	Saarbrucken	Augmented Reality Toy (ARToy)	Context awareness and localisation Augmented Reality Services User profil Network Infrastructure Security Content Storage management 3D internet services	Reality Mixer Scalable Dynamic Spatial Database Content synchronization and publication Streaming Payments
BBC R&D's Media Network Integration Laboratory	London	HybridTV Live event	Network Infrastructure Security	Content Repository and Metadata Content Protection and Provenance Content Transcoding, Adaptation and Lifecycle Streaming Device management User Profile Broker Recommendation services User Activity Monitoring
Rural Connect North West living lab	Lancaster	HybridTV Live event	Network Infrastructure Security	Content Repository and Metadata Content Protection and Provenance Content Transcoding, Adaptation and Lifecycle Streaming Device management User Profile Broker Recommendation services User Activity Monitoring Payments Secure Authorisation for Data Exchange
Future Application media lab	Berlin	clickable video, hybridTV&2nd screen, UGC, create&share, live creation, recommendation	Context awareness and localisation User Profile Security Content Storage, Access and Management	Content Repository and Metadata Content Protection and Provenance Content Transcoding, Adaptation and Lifecycle Streaming

			Augmented Reality Billing Network Infrastructure Multichannel support Content Synchronisation AR Platform Image Recognition Semantic Technologies Recommendation Platform	Device management User Profile Broker Recommendation services User Activity Monitoring Payments Secure Authorisation for Data Exchange Multimedia indexing and image/speech recognition Content Enrichment Platform Content Synchronisation and Publication Content Adaptation Ad hoc Content Sharing Scalable Dynamic Spatial Database Synchronization Content Finder/Content Enrichment Multimedia Indexing Federated Social Network
ImaginLab	Lannion, Rennes, Brest	All my content stored in the cloud All my content ready to be shared	Context awareness and localisation User Profile Security Content Storage, Access and Management Augmented Reality Billing Network Infrastructure Streaming	Multimedia indexing and image/speech recognition Content Protection and Provenance Content Enrichment Platform Recommandation Services Content Synchronisation and Publication Content Adaptation Ad hoc Content Sharing Scalable Dynamic Spatial Database Synchronization
Local Community Cinema	Kortrijk	alternative content streaming to cinema	Network Infrastructure Security Streaming Payment	Band Reservation Content Protection and Provenance Recommendation Services Content Repository and Metadata Device Management
EduCult	Koln	Active experience of a livecultural event	Multichannel support Content Synchronisation AR Platform Image Recognition Semantic Technologies Context Aware Platform Recommendation Platform	Content Finder/Content Enrichment Multimedia Indexing Federated Social Network

Table 7: test bed synthetic picture

8 - Annex : Test beds description

8.1 - Domain A test beds

8.1.1 - Description of Disney Land Paris

Title/name of the test bed : *Disneyland Paris*

Type (Living lab : user testing/technical testing) : Theme park

Private/INFINITY: Private
Short description (equipment available, connectivity): Disneyland Paris encompasses 4,800 acres (19 km2) and contains 2 theme parks, 7 resort hotels, 6 associated hotels, a golf course, railway station and a new town: Val d'Europe.

User community (how many potential users, user type) : Approximately 12 million visitors per year.

Links with other labs : None

Location : Marne-la-Vallée, in the eastern suburbs of Paris, France

Use case coverage : Games and Virtual Environments

Contact name : Bob Sumner

8.1.2 - Description of Game Online

Title/name of the test bed : "*Web-based Living-Lab centered around 3D-Internet*"

Type (Living lab : user testing/technical testing): Living Lab

Private/INFINITY : Infinity

Short description (equipment available, connectivity) : Our main focus is on Web-based delivery of interactive 2D and 3D content. This includes both client-side rendering via the browser (HTML and the XML3D-extension for 3D) as well as server-based rendering with delivery via real-time rendered video-streams.
In addition we offer a Visualization Center with extensive multi-media setups. This includes a large, high-resolution back-projected stereo presentation screen, various 2D/3D LCD-based tiled video walls, Virtual reality back-projection systems with high-quality user tracking capabilities. Also available are a selection of mobile tablet and smartphone devices for testing purposes.
For the server-side we offer a 20-node cluster using dual hex-core CPUs each with dual GPU setups for high-performance graphics and parallel processing.
Network-wise we are directly connected to the German scientific backbone via a 10GB/s up-link.
In addition to this hardware setup, we also offer consulting and support services. In the near future we will also offer courses on interactive 3D publishing on the Web.
User community (how many potential users, user type) : There is no specific user group connected with the Lab. Instead all testing takes place on the Internet via Web-based techniques.

Links with other labs : We closely collaborate with the following organizations that are all close by on the Saarbrücken campus:
-- Saarland University, Graphics Lab
-- Intel Visual Computing Institute of Saarland University
-- German Excellence Cluster on Multi-modal Computing and Interaction
-- Max Planck Institute for Informatics, Saarbrücken
-- Max Planck Institute for Software Systems, Saarbrücken

-- Center for IT Security, Privacy, and Accountability (CISPA),

Location : German Research Center for Artificial Intelligence (DFKI)
Campus D3.2 66123 Saarbrücken Germany

Use case coverage :
-- FI-Content
-- Planned collaboration with Envirofi and SafeCity

Contact name :
Philipp Slusallek <slusallek@dfki.de> Scientific Director
"Demme, Georg" <georg.demme@dfki.de> Head of DFKI Visualization Center & 3D Living Lab

8.2 - Domain B test beds

8.2.1 - Description of BBC R&D's Media Network Integration Laboratory

Title/name of the test bed : *BBC R&D's Media Network Integration Laboratory*

Type (Living lab : user testing/technical testing) : Technical testing

Private/INFINITY : Private

Short description (equipment available, connectivity) : The main test tools available in the lab are Ixia XM12 chassis equipped with 1G and 10 G modules for large scale network traffic generation, Ixia IX Chariot for the generation of real-time standard application network traffic. Shunra STN 100Mb and 1Gb real-time network emulation tool to reproduce a very wide range of network conditions. Shunra STA 1Gb and 10Gb real-time network emulation tool to reproduce a very wide range of network conditions. Shunra Network Catcher. A wide area network measuring tool. Agilent Network analyser with 100Mb, 1Gb Ethernet and STM1 STM4 interfaces. Fluke OptiView 1Gb Network analyser with Air Magnet WiFi analyser included. msMeter Media storage performance test tool. A range of network switches and routers for setting up test networks. A range of clients, servers and racks of file storage for setting up test systems. High speed raw Internet access with a range of IP addresses for temporary use for testing. Data centre and Lab bench space bookable for BBC related short term tests and experiments.

User community (how many potential users, user type) : n/a

Links with other labs : none

Location : BBC premises

Use case coverage : Professional services

Contact name : George Wright/Barbara Zambrini, BBC R&D

8.2.2 - Description of Rural Connect North West living lab

Title/name of the test bed : *RuralConnect North West Living Lab*

Type (Living lab : user testing/technical testing) : User testing of service usability, perceptual experience, and user behaviour and Technical testing of content services and networking infrastructure.

Private/INFINITY : Private

Short description (equipment available, connectivity) : The Rural Connect Living Lab, as its fundamental and founding principle, seeks to offer advanced communication services to areas which are not normally served by traditional Internet Service Providers (ISPs). The areas of immediate interest are real user communities which are currently being left behind by other UK based initiatives. The purpose is to work in collaboration with real end-user communities to ensure that rural areas are at the forefront of technology innovation within Europe.

User community (how many potential users, user type) : 6000 student residence (young adults) of the university campus + Families of 300 households in a rural village (children, middle-aged and elderly people) + Active participants for laboratory user experiments.

Links with other labs : The Rural Connect Living Lab is a member of the European Network of Living Labs - http://www.openlivinglabs.eu.

Location : Lancaster University, Lancaster, UK

Use case coverage : Professional services

Contact name : Dr Nicholas Race

8.2.3 - *Description of Future Application media lab*

Title/name of the test bed : *Fraunhofer FOKUS Future Applications and Media Lab*

Type (Living lab : user testing/technical testing) : both user testing (up to 10 users) & technical testing

Private/INFINITY : Private

Short description (equipment available, connectivity) : Multiple DVB-S2 / DVB-C / DVB-T digital TV Receiving installation, HD enabled TV and IPTV Headend, DVB to IP Multicast / Unicast turnaround, Multiple HD DVB-S2 / C Receiver & HD MPEG4 Encoder, Various highly flexible Software Streaming Server, HbbTV Playout System, Creation of self-maintained Red Button Applications, Development Platforms and SDKs, all major Smart TV platforms (vendor specific as well as standard compliant through CE-HTML, HbbTV, W3C), and HTML5 , Managed and unmanaged IPTV platforms, Hybrid TV devices, Full range of state of the art connected TVs and Set-Top-Boxes from all major manufacturers, Mobile devices as Smartphones and Tablets for 3-Screen-Services, prototypes of e.g. HTML5 enabled TV devices and STBs
➔ detailed info available at http://bit.ly/pXsVD4 & http://bit.ly/rm5Mmv

User community (how many potential users, user type) : 0 (RBB and Fraunhofer will cooperate here, users will be recruited from RBB audience in Berlin and Brandenburg)

Links with other labs : eGovernment Lab, SOA / Cloud Lab, Secure eIdentity Lab, Document IOP Lab, eHealth Lab, FUSECO Playground, OSTP, Smart Metering Lab, FAME Lab, Automotive Lab http://www.interoperability-center.com/labs

Location : Berlin, Germany

Use case coverage : Hybrid Devices and Personalisation, Social Media, UGC and Pro Content

Contact name : Stefan Arbanowski

8.3 - Domain C test beds

8.3.1 - *Description of ImagineLab*

Title/name of the test bed : *ImaginLab*

Type (Living lab : user testing/technical testing) : Living lab

Private/INFINITY : Public

Short description (equipment available, connectivity) : Imaginlab is a telco grade Next Generation Network which is dedicated to experimentation. All the technologies involved in ImaginLab are the pillars of Future Internet for telecommunication operators, broadcasters, content providers and application developers.

User community (how many potential users, user type) : more than 100 residential customers equiped with fibre access

Links with other labs : PanLab, ENOL

Location : Lannion - France

Use case coverage : UGC

Contact name : Michel Corriou / Pierre-Yves Danet

8.4 - Domain D test beds

8.4.1 - *Description of Local Community cinema*

Title/name of the test bed : *Local Community cinema*

Type (Living lab : user testing/technical testing) : technical configuration testing + long term usability testing

Private/INFINITY : Private

Short description (equipment available, connectivity) : The Kortrijk cultural ecosystem encompasses many players that are interconnected over a high bandwidth network. Amongst them are a theater which can be used for large screen, live content.

User community (how many potential users, user type) : 10-20 users: local museum, local school, local cinema, …

Links with other labs : Re-use/Re-configuration of hi-bandwidth IBBT network . More specifically, the high-bandwidth interconnection with the IBBT iLab.t facilities (added as a public testbed in the INFINITY repository) will allow for experimentation related to the Network Infrastructure and Bandwidth Reservation enablers.

Location : Kortrijk, Belgium

Use case coverage : High End B2B services

Contact name : Tom Bert/Brecht Vermeulen

8.5 - Domain E test beds

8.5.1 - *Description of EduCult test bed*

Title/name of the test bed : *"EduCult Testbed"*

Type (Living lab : user testing/technical testing): user testing, large user community

Private/INFINITY: During phase 1 private, later (phase 2) public

Short description (equipment available, connectivity):
This testbed comprises web-based applications and internet portals to access and explore cultural and educational content. The content can be retrieved and accessed by any kind of mobile and fixed network device with a common state-of-the-art internet browser (e.g. HTML, mobile web). Two representatives of this EduCult testbed are the portal of the German digital Library containing several millions of content items and the Opencast e-Learning repository. A more detailed description of these two testbed components are as follows:
German Digital Library (DDB)/Europeana: The DDB platform has aggregated the content of several cultural organizations in Germany and has a similar set of functionalities as Europeana. Both cultural platforms provides millions of digitized cultural objects which can be searched and accessed by the users. The official launch of the DDB will probably mid of 2012, however the experimental access to this platform is already available. Users of this platform have the possibility to explore cultural content and to share their experience with other users. Further the users can collect digital items in a web-based folder for later usage.
Opencast (http://www.opencast.org): Since its formation in 2007, Opencast has become a truly global community around academic video and its related areas with more than 650 participating institutions (including top university partners from around the world). Universities want to go where todays learners are to share their rich scientific and intellectual knowledge beyond the walls of the academy and to expand the boundaries of the classroom. This desire has become a critical need, as the worldwide economy calls for advanced education and training through unconfined access to learning resources. Opencast is a community-driven collaboration to develop an end- to-end, open source solution that supports the scheduling, capture, managing, encoding, and delivery of educational audio and video content and the engagement of users with that content in an accessible way across many distribution channels.
The created high quality content and the tools for the user engagement are essential for experiments and studies in use case area E.
This test bed can be extended with other platforms and applications in the area of cultural content (e.g. from Telecom Italia). Depending on the available content (e.g. rights) and user groups the access can be also limited to selected and defined/pre-registered user groups.

User community: Open to the public; dependent on the activated user community (see chapter 5.6). Mainly addressed users are students, teachers, knowledge workers and employees continuing education and off-the job training programs

Links with other labs: Europeana, eTwinning,

Location : Across Europe; one site in each European country

Use case coverage : Education and Culture

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