HORIZON 2020
The EU Framework Programme for Research and Innovation

Directorate General for Communications Networks, Content and Technology
Innovation Action

ICT-687655

D1.1 Project Plan

Dec 16 – May 17

Due date of deliverable: 30 Nov 2016
Actual submission date: 12 Jan 2017
Resubmission date: 28 Apr 2017

Start date of project: 1 December 2015 Duration: 36 months
Lead contractor for this deliverable: BBC
Version: 21 April 2017
Confidentiality status: Public

Grant Agreement number: 687655 — 2-IMMERSE — H2020-ICT-2015

Abstract

This document is a 6 month project plan to draw on progress and the challenges to be address in the next six months of the project.

Target audience

This is a public deliverable and could be read by anyone but is primarily for the benefit of the project team to help coordination and as a record of intended progress in the next 6 months. We assume the audience is familiar with television and Internet technologies. This document will be read by the Project Consortium as it implements the infrastructure and the trials to be delivered during the project.

Disclaimer

Impressum

Full project title: 2-IMMERSE

Title of the workpackage: WP1 Coordination & Management

Document title: D1.1 Project Plan 1

Editor: Phil Stenton, BBC

Workpackage Leader: Phil Stenton, BBC

Project Co-ordinator: Helene Waters, BBC

Project Leader: Phil Stenton, BBC

This project is co-funded by the European Union through the ICT programme under Horizon2020.

Copyright notice

Executive Summary

This document describes our plans for the project over the period from Dec 2016 to June 2017. It is intended as a record and summary for the project consortium.

The aim of 2-IMMERSE is to deliver single & multiscreen content services for immersive, customised and shared experiences between homes and in social spaces. We will do this by developing an *extensible infrastructure* to support the realisation of customisable multi-screen and shared experiences using object-based media. This will be delivered and tested by building four media service pilots in theatre and sport.

So the outcomes of the project will be:

- An extensible infrastructure to support multi-screen and shared experiences;
- The know-how & tools for producing and delivering object-based multi-screen experiences;
- Guidelines for using and extending the infrastructure using industry standard tools.
- Four object-based service pilots in theatre and sport, in homes and in public venues;

In the first year of the project our work has been driven by the project proposal plan and the results of our technical development, lab experiments and collaborations with stakeholders.

We have designed the architecture, built the core of the system, carried out lab experiments and built demonstrations some of the capabilities to be enabled in the pilots.

The main lesson we have learned is that in order to build an extensible platform to support the four pilots we need to take a parallel approach to understanding the demands of each pilot than a linear one where each pilot adds incremental capabilities to the infrastructure. As a result we have progressed further on the underlying platform and the requirements capture across the four trials at the expense of delivering the first trial as we had planned. In short, we found our original plan was not the optimum approach to delivering one platform to support all the trials and the 6 monthly project plans that will follow will reflect this change in approach.

In the next 6 months we intend to:

- Progress the Theatre@Home pilot;
- Continue to work with the Education department of the Royal Shakespeare Company to understand the requirements and challenges of multi-screen theatre at school;
- Map the requirements from MotoGP to the capabilities of the infrastructure;
- Continue the FA Cup experiments and refine our understanding of the stakeholder requirements;
- Extend the 2-IMMERSE technology to run on AWS;

- Gather requirements and initiate the development of the production tools to create these novel types of experiences;
- Deliver the Periodic Review and respond to the Reviewers' recommendations.

List of Authors

Phil Stenton – BBC
Ian Kegel – BT

Reviewers

Doug Williams BT
Pablo Cesar CWI
Helene Waters

1. Overview of progress Dec 2015-Jan17

1.1 Activities to date

- 2-IMMERSE Core Architecture Completed;
- Synchronisation tolerance experiments completed;
- Key stakeholders for the 4 pilots engaged;
- Observations carried out in schools during broadcast of RSC's Hamlet;
- Observations of football broadcasts in schools;
- Lab prototypes and wireframes built for MotoGP and Theatre@Home experiences;
- Multiscreen testbed built for football coverage in sports bars;
- All football content from the FA Cup final indexed and used to develop testbed experiments;
- Model of theatre-going experience created and technical requirements determined;
- Full Hamlet broadcast ingested into 2-IMMERSE playout app;
- Theatre@Home pilot system built and tested in two homes on domestic broadband;
- Synchronised scrolling script demonstrated on Samsung HBBTV2.0 TV;
- Presentation and workshop delivered at NEM with ImmersiaTV.

1.2 Technical Achievements

This section lists the key technical achievements of the first year of the 2-IMMERSE project. For further details, please see combined deliverable D2.3/D5.1 (Distributed Media Application Platform & Multi-Screen Experience Components: Description of First Release).

1.2.1 Distributed Media Application Platform (WP2)

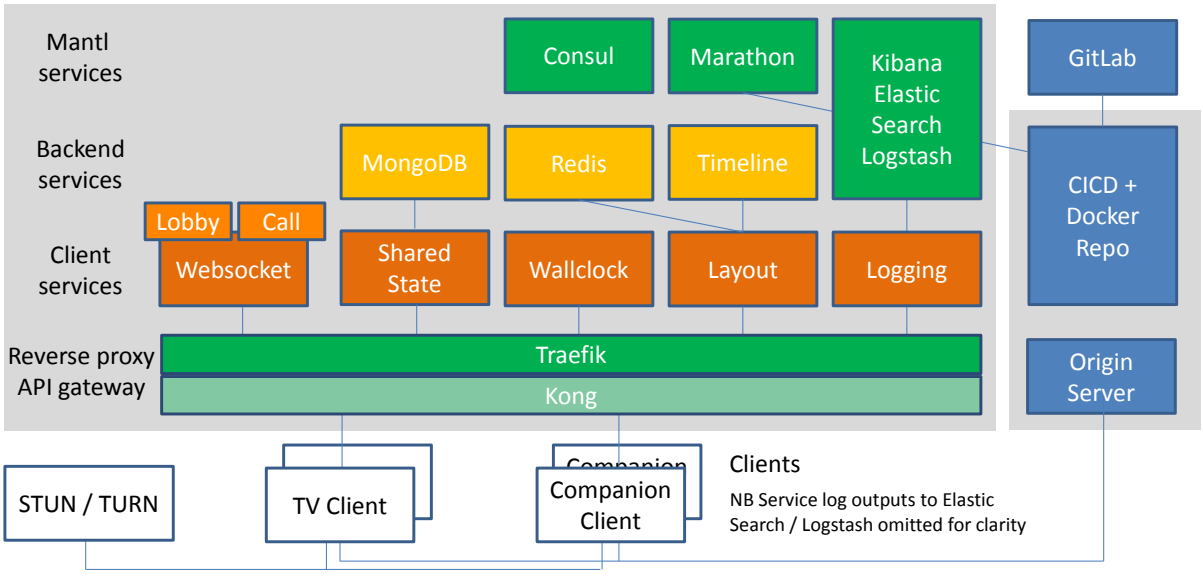

Figure 1. Services architecture built to support the 4 trials described in WP2

- 8 client and back-end services have been developed and deployed on Mantl platform, which is running on the Cisco Openstack cloud environment. Mantl is a modern platform for rapidly deploying globally-distributed services which provides an integrated set of industry-standard open-source components.
- A comprehensive support infrastructure has been established, including an Origin Server for experience-specific assets, a GitLab server for hosting code repositories and a Continuous Integration/Continuous Development (CI/CD) server to automate deployment of services on Mantl from their GitLab source.
- Client-side software for Distributed Media Applications has been developed. This loads and presents a multi-screen experience within a household on Android tablets and 'TV Emulator' devices (running both Android and MacOS). The software supports Distributed Media Application Components which are either pre-packaged or fetched at runtime.
- The Bootstrap framework has been used to achieve a consistent look and feel across the Theatre at Home DMApp by providing a library of re-skinnable UI elements, a vocabulary of CSS class names that describe appearance and behaviour of web content, and styles and behaviours that facilitate the implementation of responsive layouts.
- The Shared State Service from the MediaScape FP7 project has been integrated with the platform, providing a simple shared state model, managed through a client API.
- A solution for inter-home synchronisation has been developed which uses a cloud-based Wallclock service combined with the Shared State Service to synchronise the start of Distributed Media Application Components.

1.2.2 Components for Multi-Screen Entertainment Experiences (WP5)

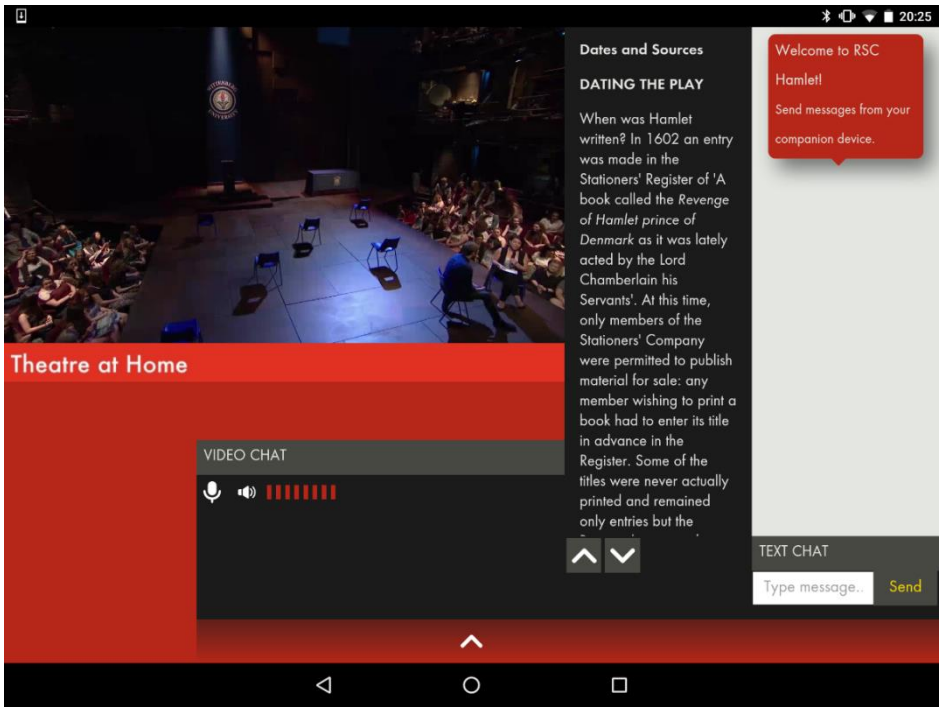

Figure 2 : Example of Companion device display from the Theatre at Home DMApp

- A novel Timeline Service has been developed, which is responsible for the temporal orchestration of a Distributed Media Application across a set of participating devices. It can accommodate a varying number of companion devices and can schedule future media changes early for a more seamless user experience.
- A novel Layout Service has been developed, which is responsible for managing and optimising the presentation of a set of Distributed Media Application Components across a set of participating devices. It supports a number of different features which enable a consistent device-independent user experience to be rendered.
- New document formats have been designed to enable timeline and layout specifications to be authored for a multi-screen experience.
- 12 reusable Distributed Media Application Components have been developed for the Theatre at Home service prototype, and all have been based on the WebComponents web standard. They include components which play audio and video, present text and image content and provide real-time video communication and text chat.
- A novel Component Switcher has been created to provide an interface on a companion device through which users can personalise the presentation of the multi-screen experience.
- Logging and monitoring of the multi-screen experience has been implemented using the Elastic Stack, and the Kibana web application has been configured to allow aggregated logs to be filtered, presented and analysed.
- A combination of off-the-shelf and bespoke tools have been used to support the authoring process so far, ranging from image and text editors to text timing editors and to visualise tools and validate layout and timeline documents.

2. Project plan overview

2.1 Dec 2016-May 2017

In this period we intend to:

- Extend the 2-IMMERSE technology to run on AWS;
- Progress the Theatre@Home pilot;
- Continue to work with the Education department of the Royal Shakespeare Company to understand the requirements and challenges of multi-screen theatre at school;
- Map the requirements from MotoGP to the capabilities of the infrastructure;
- Continue the FA Cup experiments and refine our understanding of the stakeholder requirements;
- Gather requirements and initiate the development of the production tools to create these novel types of experiences;
- Clarify the pathways to impact (iterative process over the course of the project)
- Prepare and deliver the Periodic Review and respond to guidance from the review;
- Prepare submissions for dissemination opportunities late in the year;

2.2 The revised Trial Schedule

The overall schedule for the trial is provided in Appendix 1. There have been changes to the original proposal.

We had initially scheduled Theatre in Homes as the first trial. On the advice of our liaison with the Royal Shakespeare Company we switched the school and home trials as more relationship management would be needed to set up trials in schools. In the current schedule we will perform the school trials in March 2018. Both sports trials are as scheduled in the proposal: MotoGP Aug/Sept 2017 (Silverstone) and Football May 2018 (Wembley).

With respect to the Theatre at home which was promoted to be the first trial we are behind our schedule. This is due to delays in finding solutions to the challenges of integrating video-chat, and the limitations of the current HBBTV 2.0 specification implemented within the capabilities of near-future TVs hardware (Odroid). In early prototypes we found the combination was not robust enough to deliver clarity and reliability for debugging and performance. Our early tests in the lab and in homes convinced us to delay the trials and change hardware.

3. More detailed plan

In the following sections we describe the plans for the period January to May 2017.

3.1 Theatre at Home

January:
Run ‘family and friends’ trials to test latest iteration of T@H experience
Interview stake holders (producer, designer, developers) to learn from the requirements capture, design and development interaction cycles.
February
Analyse family and friends trial results and review experience for full pilot
Demonstrate the experience to the Royal Shakespeare Company executive.
February-April
Run public trials with members of the RSC membership list
May Finish the analysis of the results, learn lessons and write up.

3.2 MotoGP

January- April
Continue discussions with Dorna Sports (Rights holders and TV production) to shape the MotoGP trial, understand the technology currently used and the production craft.

Analyse the evolving technical requirements from MotoGP and match against existing technology driven by the requirements of Theatre (Home and School)
May-June
Begin implementation of flexible graphic layout capabilities and additional Distributed Media App (DMapp) components required for MotoGP.

3.3 Theatre in School

January-March
Requirements gathering through further meetings with RSC Education Department and selected schools.
April-May
Match requirements to existing Theatre at Home capabilities.
List new capabilities required (DMapp Components to support client services)

3.4 FA Cup (Public Venue)

January-February
Continue synchronised multi-screen layout tests in the Lab using content from the ‘as-live’ demo build of last year’s FA Cup final.
Refine the as-live experience multi-screen visuals/requirements as a result of tests.
March-May
Carry out audience surveys and interviews to understand the perceptions and preferences of audiences watching football in sports bars/public houses.
June
Analyse the technical requirements from the FA Cup and match against existing technology driven by the requirements of Theatre and MotoGP to identify requirements for additional DMapp components.

3.5 Cross-pilot Activity

3.5.1 Knowledge elicitation

January-March

Knowledge elicitation from developers and producers of multi-screen experiences to solicit lessons learned regarding:

- Design ambitions, assumptions and challenges;
- Technical ambitions, assumptions and challenges.

March-June

To develop early prototypes of the production tools to be shown to potential users of them, for gathering further requirements and feedback.

3.5.2 Infrastructure

March

Migrate the platform to AWS (Cloud).

3.6 Dissemination & Impact

3.6.1 Dissemination

January-March

Script and produce a short video of Home Theatre Trial
Write-up current exploitation plans
Submit 2-IMMERSE proposal to TVX to the “TVX in Industry” track
Investigate debug environment for Samsung HBBTV 2.0 TV with the aim of demonstrating Home Theatre components.

April-June

Develop paper based on Theatre Rituals and Home Theatre
Contribute to BT Innovation event in preparation for TVX

3.6.2 Intellectual Property

January

Step through the technology and identify IP and strategy to deal with it.

3.6.3 Periodic Review

December-January

Prepare and Deliver Periodic Review

- Progress Report
- Demonstrations
- Lessons learned
- Resources used
- Financials
- Plans for the rest of the project
- Response to the reviewers’ recommendations (March-May)

Appendix 1: Revised 2-IMMERSE Schedule