iMP Annual Report

Short project description

iMP research focuses on architecture, workflow and applications for intelligent metadata-driven processing and distribution of digital movies and entertainment. The goal is to enable a 'Virtual Film Factory' in which creative professionals can work together to create and customise programmes from Petabyte-scale digital repositories, using semantic technologies to organise data and drive its processing. By separating metadata from essence, controlling all the image and sound processing operations from the metadata layer, we can maintain the underlying data library unchanged while enabling a new generation of more flexible applications. This will radically reduce the amount of data created: new versions, grades, or language releases only result in additional metadata, not new data files. The system will support a more automated workflow for content distribution from postproduction to the assembly, distribution and playout of multiple variations of programmes in different formats and locations. Figure 1 shows an overview of the phases of the project.
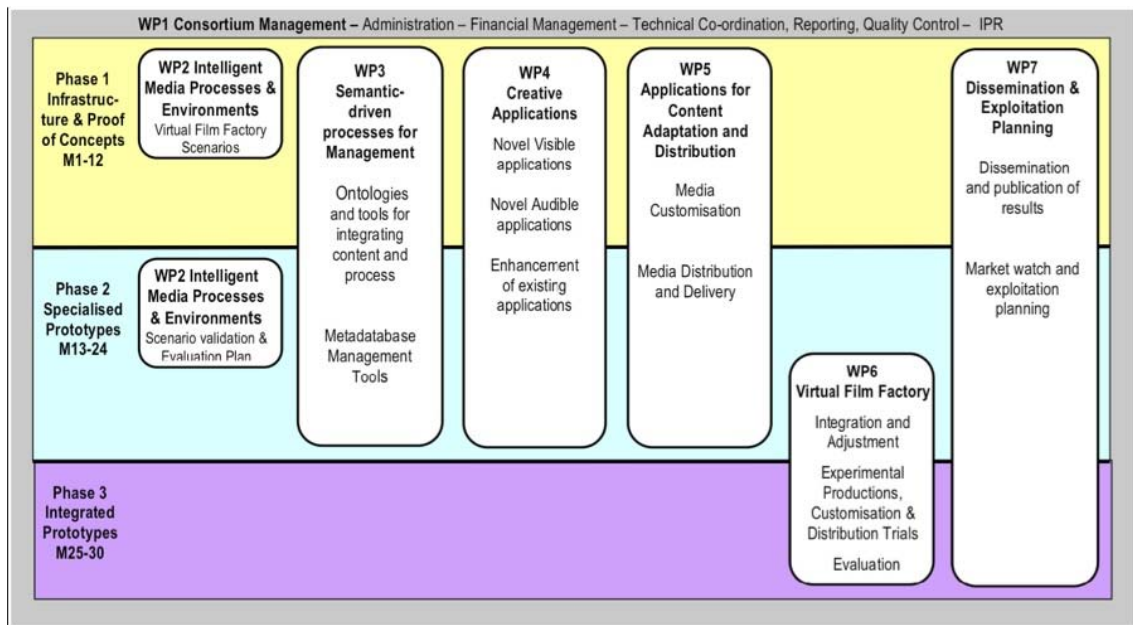

Figure 1: Project Phase Overview

Summary of activities

The major achievements of the project so far, grouped by focus, are:

- **Metadatabases and Middleware**
    - Initial API and Metadatabase Middleware Specification
    - Middleware and Metadatabase Prototype
    - First version of the iMP ontology

- **Tools and Technology**
    - Definition of relationships between graphic assets and code
    - Prototype browser viewer tools, including streaming video
    - Graphical tool for pre-visualisation of audio adaptation

- **Semantic media management and distribution**
    - Application and workflow definitions for customisation and distribution
    - Specification of distribution and customisation trials
    - Prototype software agents for distribution, brokerage and customization
   - Experimental Production Scenarios and Evaluation Plan

The current outlook for the project is positive. Initial prototypes and proof of concepts have been developed on schedule, and as the second year of the project commences, the work will be refocused on the development of integrated technology, to be ready to use within the 'Virtual Film Factory' stage of the final six months.

Important work areas

The iMP project begun the 1st January 2009, and is now approaching the end of its first year. The different work areas within the project are the following:

Analysis of post-production workflow needs

The needs of emergent workflows have been analyzed and the requirements for metadata consistency and tracking through the entire film production pipeline, from acquisition to exhibition have been identified. This entailed the definition and analysis of scenarios and requirements for post production, distribution and customization for the purpose of unifying operations on video and audio essence files by reference to metadata embedded in those files.
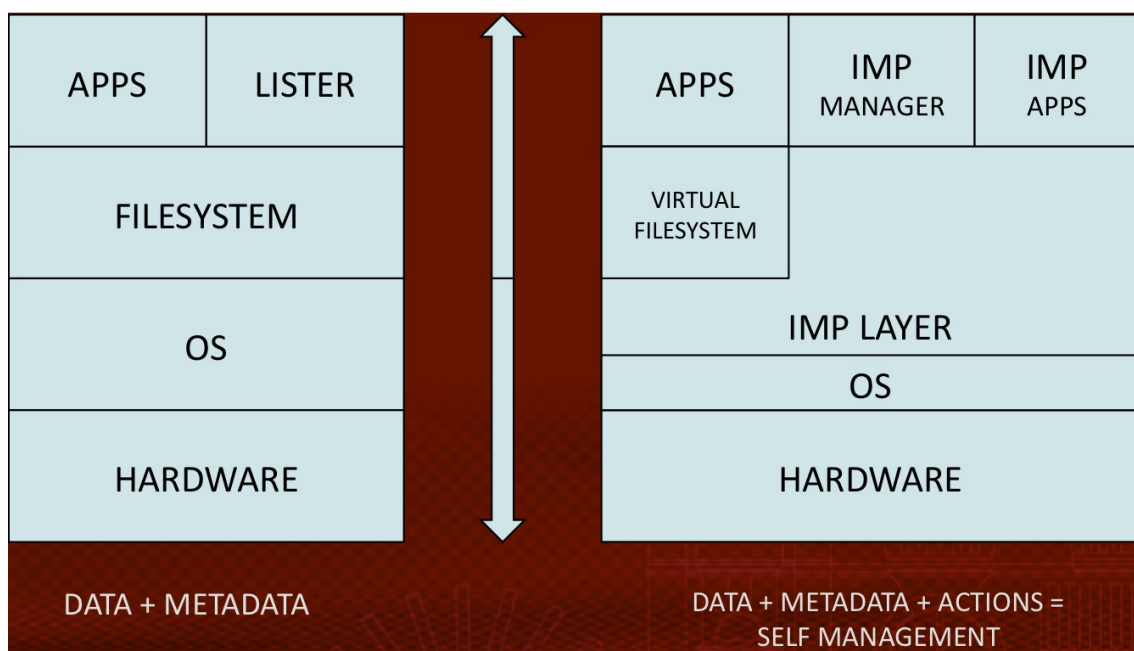

Figure 2: Media building blocks relevant to intelligent Media Processes

The breakdown of the Postproduction areas relative to an environment for the Virtual Film Factory and the specification of the concept of entrances and exits for the typologies of tasks relative to the conceptualization of Virtual Film Factory have been provided.

The iMP Model: Semantic-driven Media Management

On of the core aspects of the iMP project is the definition and creation of semantic driven processes for media management. Thus, the project has defined a metadatabase structure to support the intelligent processing and distribution of media content by developing data and metadata management systems, as well as researching more efficient means of associating storage and processing in very large scale networked media environments. Figure 3 shows an example of a the type of distributed database, organized via metadata, that is currently under development.
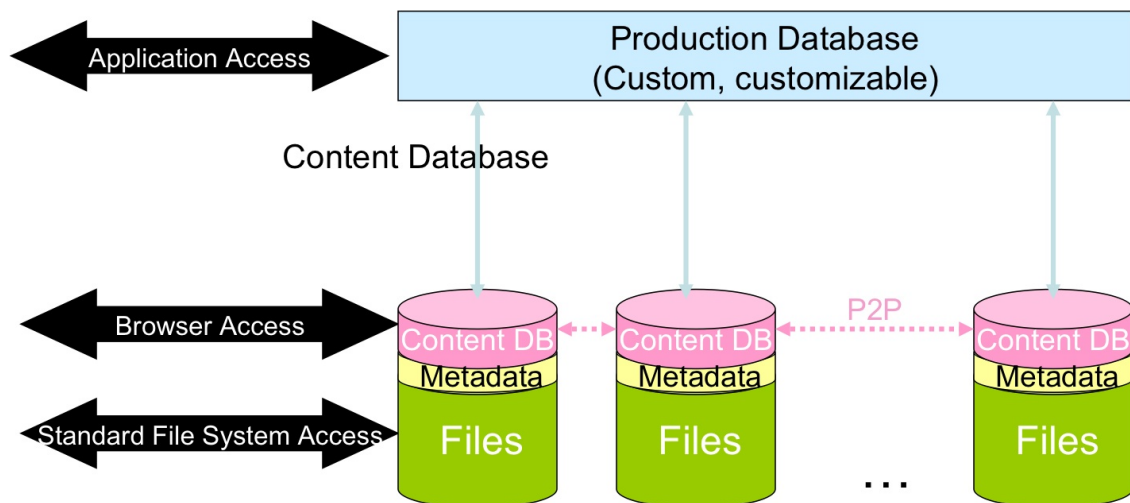
Figure 3: iMP Distributed Image Server

The following areas have been identified as the basic infrastructure requirements in need of development towards a distributed metadatabase as envisaged in this project:

- High-bandwidth cross platform file system access and metadatabase access.

- Effective support for real time streaming file system with a wide range of content formats and support for image processing at source (multi-GPU)

- Cross platform network access with support for local caching/local copy

- Distributed metadatabase access and support for semantic and other metadata

A multimedia ontology review has been performed, based on the initial suggestions from partners. As a result, a collaborative ontology development environment has been defined and a respective platform (available at http://imp.deri.ie) has been installed (see Figure 4 for an overview of one aspect of the ontology).

Figure 4: Movie Post-processing ontology overview

A new version of Neologism, the collaborative ontology development environment has been developed and deployed at http://imp.deri.ie/ontology/ and it is used to extend the iMP ontologies.

Creative applications for integration with the iMP metadatabase

A first prototype of the graphic engine supporting the iMP architecture has been developed (see Figure 5). It represents the proof-of-concept work for the graphical display sections of the iMP project, and it is hoped that it will provide the basis for the integration of several further technologies that are being developed elsewhere in the project. Once this integration is complete it should form a strong basis for further integration with real-world data.

Figure 5: Streaming video in a 3D environment

The current status of the graphical work is the extension of the application to create a metadatabase browser tool, following closely the analysis of the post-production needs (presented above).

Regarding audio research, the initial goal in the front of new creative audio tools is to make sure that all the metadata describing the various processes of the chain that are relevant to audio are made accessible to these novel tools, in particular, changes and additions in graphics, and non-linear editing. The project has also produced prototypes integrating technologies for room-acoustics and spacialised 3D audio, using high-level geometrical-oriented parameters. Additionally, new algorithms for automatically deducing the 3D geometry of a scene based only on the audio recorded there are being developed.

Figure 6: Screenshots showing the creative audio tools

Finally, support for camera metadata and a number of different raw camera formats was included in FilmLight's 'Baselight' application, as a first step towards more integration between production and post production, as well as more support for integrating metadata based conform tools.

User Involvement, Promotion and Awareness

Regarding the activity of Metadata Classes for Media Customisation, the iMP project has developed links with several other projects, in particular the FP7 IP 20203D Media.

A press release announcing the project launch was unveiled on the Barcelona Media public website (http://www.barcelonamedia.org/noticies/140/en)

The official iMP web site www.imp-project.eu was created at the beginning of the project. The web site provides project overviews and highlights, up-to-date information on intermediate and final project results, including public reports and publications, as well as synthesis reports drawn from selected confidential material. The website will also display project events, including e.g. user group meetings, conferences and workshops, necessary contact details (coordinator) etc. The website will be cross-linked from/to other relevant EC and EC sponsored sites.

The project has put in motion to form the user-group, which will play an increasingly important role for the remainder of the duration of the project. Plans

have also been made to hold a one-day training for professionals workshop as part of the project dissemination and training plans.

A poster, "Real-time Visualisation and Browsing of a Distributed Video Database", was presented at the ACM International Conference on Advances in Computerised Entertainment Technology (ACE 2009), in Athens, October 2009. The poster is shown in the figure below. The poster was designed to promote the iMP project as much as possible, and during the conference generated much interest among the conference attendees. Please see the addendum file (iMP_ACE_SUBM_FINAL.pdf) for the full submission.

Figure 7: Poster shown at ACE2009

Future work

The main objectives to achieve until the end of the project life will be:

- Prototype of Intelligent Storage, and Middleware
- Robust and intuitive audible applications
- Combined previsualisation tool for of graphic and audiovisual content
- Bespoke Content Delivery Systems
- Final version of the Virtual Film Factory; Semantic tools and Ontologies documentation

Further information

iMP website: http://imp-project.eu/