



Executive Summary of Deliverable 4.5

Integrated Knowledge Sharing Environment

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1 Executive Summary

This deliverable reports on the integration of user interfaces developed within workpackage 4 of X-Media. Specifically, this deliverable focuses on their integration with respect to the following aspects:

- Integration among user interfaces developed in X-Media.
- Integration of X-Media technologies developed outside of workpackage 4.
- Integration with X-Media infrastructure.

These different aspects of integration are addressed along the lines of the working task 4.5 defined for the last phase of workpackage 4. As highlighted also in the description of work, in the last phase, the development of the end user tools that started in month 29 is continued, however, with a different development focus. Unlike prior developments in task 4.5 focusing on novel methods for knowledge sharing and process support, the focus is now on the integration of the different end user tools developed before and the integration of the methods developed within and outside of this workpackage. The subtasks of task 4.5 correspond closely to actual user tasks as supported by the user interfaces developed in workpackage 4, e.g. searching and browsing, document annotation, or knowledge analysis. This deliverable is organized along these tasks and presents for each task

- the user interfaces developed,
- their design,
- their integration (according to the above aspects),
- and the user benefits gained by the integration.

Section 2 of the deliverable introduces the integration of the meta knowledge framework and the LENA browser. This combination enables users to investigate the value of information based on meta knowledge, i.e. based on the provenance of information, its certainty/reliability, recency and its contributors/agents. The *metak* framework has been developed in workpackage 2 of X-Media and implements methods for storing, representing, and querying meta knowledge.

Section 3 and 4 illustrate the integration of different tools for semantic search and browsing. The user benefit of such integration is the possibility to continue a semantic search, executed by means of novel X-Media search tools, with the browsing of the information identified by such searches. The SemSearch and SemSearchXplorer tools

have been integrated with the LENA browser for this purpose (Section 3). Moreover, the search tool K-Search, the X-Media image similarity search tool, and the visualization tool XMPLOTS have been integrated to facilitate multiple perspectives onto search results produced by one or many different retrieval methods (Section 4).

Section 5 highlights the integration of process logging and process representation methods developed in workpackage 1, with semantic email support developed in workpackage 4. The integration is implemented as a plugin for the Thunderbird email client that tracks the transfer of documents by email attachments. A module for the X-Media Kernel implements a StickyLog web service that is used to store tracked activities in the X-Media Knowledge Base. By means of the search and browsing tools presented in Section 3 and 4, users can then investigate on the lifecycle of documents.

Section 6 presents K-Views, a tool that supports hierarchical graph analysis, as required for instance, in the hypothesis investigation during root cause analysis in Issue Resolution (IR) at Rolls-Royce. It integrates three different modules that support different analysis strategies:

Analysis Tree which uses interactive tree graph construction to support ontology-guided, visual hypothesis analysis.

Knowledge Graph used to visualise the results of search. The Knowledge Graph also initially provided an alternative perspective for visualising the results of the hypothesis analysis obtained using the analysis tree.

Knowledge Cloud which provides an alternative, co-ordinated (visual) perspective, using a network graph to visualise the results of the analysis obtained using the analysis tree. The knowledge cloud may also be used to browse the structure of ontologies and semantic repositories.

In the process of working the user may notice errors in the main repository produced by extraction or fusion tools. Section 7 describes methods for user feedback integration that facilitate users to correct erroneous results produced by X-Media Kernel components for information extraction.

Objective of task 4.2.1 was to develop a tool (i.e. a functional prototype) for the integrated maintenance of a schema and a fact base by means annotating text documents. Section 8 presents the mm2flo paradigm as one solution for this task. It is accompanied by an intuitive user interface that is also illustrated in Section 8.

Section 9 presents the Semantic Scratch Pad that implements methods for inter-tool communication that facilitate the coupling of multiple user tools by a versatile user interface. Core features of the Semantic Scratch Pad are highlighted by an illustration of its employment in the Experimental Vibration Use Case at Rolls-Royce.