This project is funded under the
ICT Policy Support Programme part of the
Competitiveness and Innovation Framework Programme.

Project

Project Acronym:	AthenaPlus
Grant Agreement number:	325098
Project Title:	Access to cultural heritage networks for Europeana

Deliverable

Deliverable name:	**First release of the AthenaPlus tools**
Deliverable number:	**D5.3**
Delivery date:	March 2014
Dissemination level:	Public
Status	Final
Authors (organisation)	Sam H. Minelli, Paolo Ongaro, Alberto Raggioli, Daniele Ugoletti, Rubino Saccoccio (META), Barbara Dierickx (PACKED vzw),
Contributors (organisation)	Joris Janssens (PACKED vzw)
Reviewers (organisation)	Marzia Piccininno (ICCU), Mercè López (i2CAT), Marc Aguilar (i2CAT)

Revision History

Revision	Date	Author	Organisation	Description
V0.1	2014-02	Sam Minelli	META	TOC
V0.2-5	2014-02	Sam Minelli, Paolo Ongaro, Rubino Saccoccio, Daniele Ugoletti, Alberto Raggioli,	META	All sections
V0.6	2014-03	Barbara Dierickx	PACKED vzw	Contribution to
V0.7	2014-03	Sam H. Minelli	META	Finalization
V0.8	2014-03	Sam H. Minelli, Barbara Dierickx	META, PACKED vzw	Finalization after the internal review
V0.9	2014-03	Maria Teresa Natale	ICCU	Formal check

Statement of originality

This deliverable contains original unpublished work except where clearly indicated otherwise. Acknowledgement of previously published material and of the work of others has been made through appropriate citation, quotation or both.

Project Coordinator: Istituto centrale per il catalogo unico delle biblioteche italiane
Address : Viale Castro Pretorio 105 – 00185 Roma
Phone number : +3906 06 49210 425
E-mail : info@athenaplus.eu
Project WEB site address : http://www.athenaplus.eu

Table of Contents

1 EXECUTIVE SUMMARY 3

2 INTRODUCTION 4

3 BACKGROUND 5

3.1 Outcomes of D5.1 5

3.2 Outcomes of D5.2 5

3.3 Outcomes of D7.2 7

3.4 Role of D5.3 in the Project 7

3.5 Relations with other WPs 8

4 FROM MIBACT AND INDICATE GUIDELINES TO MOVIO 9

5 THE SEMANTIC MULTIMEDIA CONTENT MANAGEMENT SYSTEM: MOVIO 11

6 MOVIO ARCHITECTURE 12

6.1 The Glizy framework 12

6.2 Pages creation 14

6.3 Glizy technical requirements 14

6.4 Installations and access to a working instance 15

7 LICENSE MODELS 16

7.1 MOVIO License model 16

7.2 License Compatibility 16

7.3 License terms 16

7.4 External licenses (Google, etc.) 16

8 MOVIO TOOLS 17

8.1 The Ontology Builder tool 17

8.2 The Storyteller 19

8.3 Hot Spots 21

8.4 Digital exhibition pages 21

8.5 A catalogue of digital exhibitions 21

8.6 Slideshow 22

8.7 Mapping tool 23

8.8 The timeline 23

9 FROM THE REQUIREMENTS TO MOVIO REALIZED TOOLS 24

10 REAL CASES APPLICATIONS 30
10.1 UNIMORE (UNIversità degli studi di MOdena e Reggio Emilia): an EDUCATIONAL case 30
11 NEXT STEPS 32
11.1 Planning of further components and expansion of the tools available 32
11.2 Educational toolbox 33
11.2.1 The decision-making process 33
11.2.2 Outline of the components to be developed 34
12 CONCLUSIONS 37
12.1 Results and Impact 37
12.2 Next steps 37
13 APPENDIX 1: REFERENCES 38
14 APPENDIX 2: DEFINITION OF TERMS AND ABBREVIATIONS 39
15 APPENDIX 3: CURRENT LIST OF INTERFACE TERMS OF THE MOVIO BACK-END40
16 APPENDIX 4: MOVIO HANDBOOKS 41

1 EXECUTIVE SUMMARY

In a nutshell, this deliverable will describe the logical path, starting from the very initial needs over the user requirements identification and finally to the implementation and the release of the first tools of the AthenaPlus project. The most important tools (including the ontology builder and the storyteller) will be presented in Section 8 and all the manuals of the currently available tools will be included to this deliverable.

This deliverable describes the first release of the AthenaPlus tools, which follows the D5.1 and D5.2 requirements and the D7.2 recommendations. The cited three deliverables (D5.1, D5.2 and its addendum, and the D7.2) constitute the background of this deliverable (see section 3 and section 9); looking further back in time (see section 4): in 2011, the Italian Ministry for Cultural Heritage and Tourism (MiBACT) published a guideline reference book analysing the state of the art and best practices of digital exhibitions made available on-line and offered a handbook which has been the basis for the first set of tools to be provided within the AthenaPlus project.

The role of D5.3 is mainly the delivery of these initial tools enabling to set up the training sessions to the AthenaPlus partners who will then start using them in the form of MOVIO. As such this written deliverable provides an insight into the platform architecture (see section 6) and the MIT open source license model, under which any subject can use and redistribute the software (see section 7). Then each main tool component is explored more in detail (see section 8) and each tool is further explained through the manuals (see Appendix 4). Particular attention is given to the Ontology Builder tool, the most relevant semantic instrument of the MOVIO application. The next developments concerning the delivery of more AthenaPlus creative tools are illustrated in chapter 11.

The current MOVIO release is already in use by one university in Italy as showcased in the section 10.1: this early educational user is a follow up of the AthenaPlus workshop held in Berlin in October 2013 and shows a real exploitation and distribution of the initial MOVIO platform. More use cases are under development at the time of writing this report. The availability of more tools in the complete AthenaPlus layer of tools will become apparent over the next months, with for example the release of the tools as part of the educational toolkit in June 2014.

2 INTRODUCTION

Digital exhibitions are hypermedia collections accessible via the web. They are made of digital collections, which are linked together, made accessible through the modern technology, through a user-centred approach, absorbing different experiences. They are dynamic/interactive products that can offer services and be updated periodically, and can be generated on the occasion of a real event (e.g. physical exhibition) or born digital. This deliverable presents the initial tools which aim at providing enriched experiences to such real event, involving both users - in a process of discovery, knowledge acquisition entertaining and learning, and professional curators – in creating and providing meaning to the assembled digital collection.

Promoting cultural heritage and helping users to gain knowledge about it are main goals for galleries, libraries archives and museums. Often museum curators organise real exhibitions with no on-line digital version of their exhibitions, reducing the potential number of visitors. On the other side large volume of cultural artworks remain invisible if the cultural objects cannot be accessed while they could be at least 'virtually' visited through digital exhibitions. In both cases, a big cultural dissemination opportunity is missed. The first guideline about the state of the art, the best practices, and the procedures for these relatively new ways to access culture was published in Italy (written by MiBAC).

The creator of such digital exhibition is an expert[1] who takes the responsibility of how the exhibition is made, how the user accesses the content and engages in cultural dissemination. Users generally want to personalise their access to cultural knowledge (some of them prefer more textual descriptions, some expect audio narrations and video presentations, etc.), the paradigms of content fruition and learning are changing.

This deliverable will provide a short recall and outcomes of the past user requirements deliverables and recommendations investigated within the AthenaPlus project, and then it will describe the origins of MOVIO. Starting from the past guidelines published by MiBACT and its early user needs up to the AthenaPlus challenge: to transform the existing MOVIO platform into a broader toolkit on a European level to be distributed to museums, archives and any interested user, to be used to access the Europeana content in a new way and to target new user groups such as education and tourism. Then, the deliverable will present the general features, the architecture and framework and licensing model of the Semantic Multimedia Content Management System (i.e. MOVIO) dedicated to manage and valorise cultural narrations using existing data.

To provide inputs to the consecutive training activities, this deliverable will highlight some of the most important MOVIO components (in particular the semantic based ones: the Ontology Builder and the Storyteller) with examples about how to create virtual exhibitions, how to create a media archive and enrich its annotations. The deliverable will introduce the back-end and the front-end of MOVIO and the design aspects of the tools that are ready at the time of writing. All written training materials about each tool are provided in separate documents (see section 16 - appendix 4) with the rationale of producing easy to update support. In fact, it would be very difficult and resource consuming to update a hundred pages training hand-books: there are parts that never change and pages which will be updated frequently as any upgrade of the platform will be released. Thus we decided to generate a single manual for each tool and keep the manuals updated continually[2].

[1] An 'expert' in this context can refer to the case where a professional museum curator takes on the role of creator of a digital exhibition about artefacts from the department that he/she is curating. Based on his expert knowledge, the curator is able to design a good narrative and make decisions on how to assemble the artefacts, how to integrate descriptions, etc. In other cases, an 'expert' may also be an experienced tourist guide, compiling an exhibition about a city or region he/she is very familiar with. An expert might even also be a passionate amateur; a member of the general public who has gained knowledge about a particular topic and thus acquired enough skill to present a digital exhibition about a certain topic in a 'curated' way.

[2] It should be noted here that these manuals will form the base for WP5 T5.4 concerning the training of the consortium partners. The written manuals will be transferred in an online wiki-environment as part of the available training materials (for reason of easy updating), and will be complemented by screencasts and eventual other materials (delivery: M14).

3 Background

This section will provide a short recall and outcomes of the past user requirements deliverables produced within the project: 'Report on the user needs and requirements' (D5.1) and 'Report on existing tools and devices related to narrative approaches and requirement functionalities' (D5.2) and finally, the scope of the current D5.3. Additionally we also take into account the outcomes of the 'Analysis, scenarios use cases, opportunities of innovative services for DCH, and future development' (D7.2).

3.1 Outcomes of D5.1

The AthenaPlus 'Report on the user needs and requirements' (D5.1) collected information on user needs and requirements in relation to the creative applications for the re-use of digital cultural heritage content through the approach called 'personas'. This methodology was followed to select subjects' behaviours and thus needs, among Europeana's hypothetic stakeholders (schoolteachers, retired persons, tourist guides, and specialists such as musicians, historians or archaeologist; i.e. those harbouring a specific interest in cultural history. In particular, the D5.1 described applications or online platforms that are inspiring examples; including the key components they felt would be appropriate to these kinds of applications and reported on methodologies concerning online interaction or online usability. Such applications and on-line platform's tools have been analysed and part of similar services have been analysed and targeted for the MOVIO tools delivery. Finally, the WP5 Working Group[3] members made the following remarks:

- No specific technical skills should be needed to use the back-end of the tools. Being able to use a WYSIWYG editor should suffice. However the possibility to have more advanced customisation (for example html) should be offered for the more technically skilled users.
- IT systems are always a balance between complexity and flexibility. For example, while timelines are a common tool across many exhibitions, the granularity, scale and numbers (separate or parallel) can vary widely from one exhibition to another. For example, it is more and more common to show different scopes (geographical scope: local, county, continent, subject scope: person, object, battalion...). Having a system that allows this diversity means a system less easy to use, etc.
- Application should allow end-users to freely explore content as well as to follow a predefined path (virtual exhibition, learning package...).
- External data can be used as a direct source of content or as a source of inspiration while creating the tools' end products.
- End products of tools (websites, PDF, tablet-application...) should be licensable under different licenses (including Creative Commons licenses).
- Public end products of the tools (e.g. websites) should be reachable by using QR-codes.
- Users should be able to comment, tag or create annotations on media which can be stored by the system.
- Attention should be given to the use of mobile platforms (e.g. tablet) in museums and formal school context and all developments implemented as responsive design – i.e. responding to all screen sizes and platforms.
- Both the back-end and the front-end of the system should be fully multilingual.
- The tools **should not** fully automatically create digital exhibitions, tourist routes, or educational packages rather enable the curation by a collection/educational expert to intuitively and flexibly compose, and publish their own solutions.

3.2 Outcomes of D5.2

[3] General recommendations from the WG, page 29 and 30 of D5.1: http://athenaplus.eu/getFile.php?id=157

The 'Report on existing tools and devices related to narrative approaches and requirement functionalities' (D5.2) provided an overview of existing tools and applications that might serve as examples for the development of the creative applications for the use of digital cultural heritage content. Particular attention was dedicated in D5.2 to the storytelling methodology and the common features for data, tools and supports needed for the realisation of digital stories and finally relevant components that might be implemented in the online AthenaPlus application environment. Based on the survey work documented in D5.2[4], the recommendations and outcomes were summarized as:

- Successful narrative results can only be attained when starting from a proper digital asset management system, which is transparent in use to the user (e.g. story creator) but also to the content contributing institution (uploading the digital material users may work with).
- The system should also allow working with the same digital content on different devices, in different languages and with the possibility to satisfy the needs of different kind of users (generic, schools, researchers).
- The system should make use of the possibilities provided by the advent of devices, which are always connected and the emergence of web services (APIs) provided by digital asset and collection management systems.
- An integration of external data sources (already available on the web) and the content contained in the digital asset or collection management system must be possible, in order to enrich the uploaded content and/or make links to a personal information stream (e.g. Facebook profile).
- Investigate the possibility to use Europeana as one of the main sources of such external data, thereby exploring the functionalities Linked Open Data offers.
- The use of GIS should be encouraged so that interactive cartography or maps can become part of the narrative story.
- Editing tools should be available in order to treat the digital content in such a way that a coherent story or unit of meaning (e.g. exhibition) can be created by an editor (e.g. general user, professional curator).
- These tools should allow editing also of the separate content pieces – which might be 2D as well as text or sound documents.
- An ontology builder should be implemented as a way of meaningfully structuring the contents. The ontology in use could be an existing one, or it could be built from scratch using the keywords that fit the theme or context of the story that the user wants to develop.
- In the case of narration on mobile devices, the user should be able to interact with the content of the story by simply changing and adjusting his/her trajectory and / or behaviour.

In general, the main challenge evidenced by D5.2 is to create tools for the structuring and re-use of important volumes of data and metadata from users, sensitive and collaborative, giving a new vision of museum collections, digital heritage objects, art works in order to make the user experience more engaging and participatory.
The technical team of WP5 will keep these recommendations in mind when developing the AthenaPlus application environment and the tools that will serve the pilots in WP6. More specifically, they concern:

- A tool allowing for the creation of virtual exhibitions and cultural tourism routes, which will be useful for Task 6.3 (BNCRM, ICIMSS, ILS, LAM, RA, PIM, ICCU, HMTC).
- An environment that will facilitate digital storytelling (made by Dédale) to be used in Task 6.2.
- A tool involving GIS components applied to digital cultural heritage for Task 6.3 (made by IPCHS).

[4] Deliverable D5.2, pages: 59, 60: http://athenaplus.eu/getFile.php?id=178

All previous recommendations have been studied and analysed also in terms of feasibility and implementation identifying most relevant aspects and most realistic implementation in terms of time and resources. As a consequence, the D5.2 was finally integrated including a detailed list of requirements considered mandatory by AthenaPlus partners and were in line with the DoW. **The addendum to D5.2 clearly explained the reasons why AthenaPlus chose MOVIO from the group of possible software proposals.** The AthenaPlus WP5 Working Group, together with the technical team of META and the interested members from the consortium, defined in the addendum[5] the functional requirements for the tools to be developed. The results of this process will serve the pilot actions of WP6 that will be run in relation to digital storytelling, virtual exhibitions, and educational use.

3.3 Outcomes of D7.2

The deliverable 'Analysis, scenarios use cases, opportunities of innovative services for DCH, and future development' (D7.2) coordinated by Michael Culture association was produced following the open workshop on Digital Storytelling for mediation and valorisation of cultural heritage, held in Berlin on the 9th of October 2013 (adjacent to the AthenaPlus plenary meeting). It aimed at exploring concrete opportunities of digital storytelling for the valorisation of digital cultural heritage content. This deliverable addressed the issues of how to exploit an ICT narrative potential for cultural heritage mediation projects, how to make digital storytelling tools efficient for a DCH valorisation and mediation projects, how to create connected, multimedia and interactive narratives and finally, the digital storytelling potential for the transmission of knowledge, experience and information sharing on DCH. Moreover, D7.2 described examples of relevant tools for implementing digital storytelling projects and examples of mobile and trans-media storytelling projects.

Of course AthenaPlus can't follow all possible directions and collect all possible tools: some of the instruments described would be too expensive in terms of technology and of licenses to be applied to AthenaPlus, nevertheless the D7.2 provides a good vision and recommendations for cultural institutions and museums who wish to engage in digital storytelling methodologies.

3.4 Role of D5.3 in the Project

According to the contractual DoW, the main goal of WP5 is "*to analyze, define, configure and develop the software components necessary to enrich metadata for a creative use of the content collected by the project*". The role of this deliverable is to use the knowledge gathered mainly by the previous two deliverables: 'Report on the user needs and requirements' (D5.1) and 'Report on existing tools and devices related to narrative approaches and requirement functionalities' (D5.2).

The results of this deliverable will further impact the tasks of WP6. WP6 will, amongst other, evaluate and test the tools and solutions developed or customised within WP5 for checking their integration with the Europeana service, on the basis of the pilots actions. According to the DoW, the objective of D5.3 is the '*First release of the AthenaPlus tools: This deliverable, coordinated by META and PACKED, will realize a first version of the AthenaPlus tools. Virtual exhibitions, cultural tourist routes applications and an educational toolbox will be fully developed in way to submit them to test users. The user feedback and the complete availability of semantic resources will lead to the final release.'*

As such, this deliverable will provide a technical presentation of the Semantic Multimedia Content Management Systems (SMCMS) chosen to support the AthenaPlus project plan: the MOVIO open source platform. We will describe more in detail MOVIO and its components in the following sections and annexes (its architecture, the licensing model and all the available tools). In addition, as external annexes, we will provide all the user handbooks and tutorials. Finally, this deliverable aims at mapping the recommendations and requirements previously identified to the released tools of MOVIO.

D5.3 also makes available the MOVIO manuals for the training activities. In particular, the manuals will be used to set up the training sessions to be reported in the next D5.4 ('Training materials for supporting the use of the AthenaPlus tools') due by month 14. Finally, the revision of the AthenaPlus tools (D5.5,

[5] Addendum to D5.2: http://athenaplus.eu/getFile.php?id=287

which is expected by month 30) will realize the final version of the AthenaPlus tools: *The user suggestions, coming from the previous tests, and the availability of more semantic resources, coming from the Partners' works in other WPs, will permit a revision of the previously implemented tools. Virtual exhibitions, cultural tourist routes applications and an educational toolbox will be complemented and integrated in a way to obtain the most effective results for use by the AthenaPlus consortium and outside stakeholders.*

3.5 Relations with other WPs

The main WP strictly depending on D5.3 (and on WP5 activities delivery in general) is WP6. WP6 is expected to evaluate and test the tools and solutions designed and developed by WP5. The testing and training activity will require the definition of an evaluation methodology for the pilot services and the run of parallel pilots to demonstrate the benefit of the proposed solutions. After collecting feedback from the partners testing the pilots, WP6 will perform assessment stages and technical tests to provide the relevant feedback for the technical team working in WP5 and WP7 will cooperate to disseminate this WP results.

4 From MiBACT and INDICATE guidelines to MOVIO

This section describes the origins of MOVIO: starting from the past guidelines published by MiBACT and its early users needs, up to the AthenaPlus user communities and their requirements and recommendations with a view to the future.

In 2011[6] the Italian *Istituto centrale per il catalogo unico delle biblioteche* (ICCU), in collaboration with the *Istituto centrale per gli archivi* and the *Osservatorio tecnologico per i beni e le attività culturali*, published the guidelines for the creation of digital online exhibitions. This handbook collected contributions from a working group of experts from museums, libraries, archives, institutions and other cultural organisations.

The guidelines analysed the state of the art of digital exhibitions made available online, and pointed out best practices and methodologies of a new way of narrating cultural content exploiting the opportunities of the new media and the Internet. Three years after the publication of the guidelines, the user demand for a new approach of publication of cultural content is still unattended in a satisfactory way. As a consequence, ICCU supported the set-up of a project addressing the recommendations written in the above mentioned handbook[7] which was also translated in English and Arabic and enriched in the framework of the INDICATE[8] project. These publications evidenced the lack of tools enabling cultural institutions, independently from their nature (public or private) to create and publish easily cultural narrations with personalised paths (for experts and non-experts) and providing access to local resources, let it be well known works of art or 'unexplored' content. Many existing solutions were explored and examined with the eye of the curator and none of them fully answered the main need of content narration. None for example offered a complete set of dedicated tools like mapping, timelines, slideshows or a storyteller.

The project called MOVIO has been supported by the *Fondazione Telecom Italia* in 2011 within a call for projects with a focus on the valorisation of the 'invisible' works of art through digital exhibitions; it was one of the seven winners of the national competition[9]. The MOVIO proposal was answering to some of the needs of the Italian museum curators, but only aimed at museums and providing basic initial tools. Nevertheless, it captured immediately the interest of experts and institutions for its peculiar relevance and ability to support the above-mentioned lacks. Could the Italian MOVIO be expanded in terms of tools, features and targeted to education and tourism communities? AthenaPlus took the challenge of bringing MOVIO into a large consortium of cultural subjects which could transform the local well designed and open source platform and bringing it into an European dimension and creating support, and new tools, not only to each cultural partner of the AthenaPlus project but also to the Europeana Foundation (enabling the usage of its data) and to other communities. As mentioned before, the MOVIO tool was not randomly elected. It was mentioned in the earlier deliverables as just one of the available tools that could become the basic framework (or backbone) for the further development of the AthenaPlus tools. Feedback from the consortium members pointed towards MOVIO as the best tool in this position (see Addendum to the D5.2). From this point on, further work on MOVIO was carried out to the satisfaction of the project partners and respecting the DoW.

The clear needs of museum curators would be addressed through a toolkit enabling internal personnel, with or without IT skills, to create a digital exhibition safeguarding the exhibition logics and semantics. The goal was to allow this toolkit to be freely accessible and interoperable and we decided to open it further to the communities of developers by using the open source model[10]. We expect that in particular small institutions (including museums, archives, libraries, archaeological areas, etc.), which typically have no resources to manage online valorisation models, to take advantage of this platform. The exhibitions are often the only occasion to reach the end users (schools, researchers, and general public) but still, the traditional exhibitions can only expose a small part of their collections, leaving the other objects hidden and unexplored.

[6] *Mostre virtuali online: linee guida per la realizzazione*, Version 1.0 (Sept. 2011), Roma: MiBAC, 2011, http://www.otebac.it/index.php?it/320/mostre-virtuali-online-linee-guida-per-la-realizzazione. See also: *Mostre virtuali online. Linee guida per la realizzazione. La genesi di un progetto per il web culturale*, DigItalia, Marina Giannetto, 1 (2011), http://digitalia.sbn.it/article/view/498.
[7] Mostre virtuali online cit., http://www.otebac.it/getFile.php?id=502.
[8] http://www.indicate-project.org/getFile.php?id=359
[9] http://www.fondazionetelecomitalia.it/bandi/bandi/beni-culturali-invisibili/43/progetti-finanziati
[10] As MOVIO is an open source tool, it offers the possibility to designers to download the source code and build upon it. For instance, it is possible to add additional modules or tools; it is possible to customise or alter the lay-out further; it is possible to integrate MOVIO (or parts of it) in an already existing technical framework or environment.

The think tank behind MOVIO was aware that this toolkit should be innovative but also enabling museums to do the digitisation and cataloguing of their archives and not doubling efforts. We supposed that MOVIO should be an instrument supporting and integrating daily work, and as such we aimed to create a platform which should solve other issues than just publishing. Or better, we supposed that institutions would need first a media archive, to be able then to then publish their collections in a website environment.

In 2011 *CulturaItalia* and the *Osservatorio tecnologico per i beni e le attività culturali* examined 4.000 interviews on an heterogeneous sample of population and evidenced that 70% of them were interested to look for information about museums and exhibitions through the Internet. Among them, 68.2% would prefer to look such information on websites managed by public and institutional subjects; over 2.800 answers, 82.5% would access digital exhibitions for personal amusement, 24.1% for work, 31.5% for study and research.

In 2010 the Marcus Institute for Digital Education in the Arts (MIDEA) published the *Horizon Report*[11] *(*the museum edition) that described the technologies which could best support museums activities in the near and long term future. Clearly the report put into evidence the mobile applications, the social and community interaction, the augmented reality, the natural interaction, the semantic web, the 'big' and open data and the applications using localised information. The educational edition[12] of the Horizon Report published in the same year, addressed the technologies which best supported education, research and school activities for learning. All scenarios present a growing use of digital and mobile technologies lead by a massive and exponential growth of content online (images, text, video, etc.) made accessible in an ubiquitous way for leisure, work and study.

Finally, another fundamental reference for our project; in 2010 the European Commission published[13] the *Analysis of the consultation launched by the Green Paper on "Unlocking the potential of cultural and creative industries"*[14]. This publication faced the policy and economical implications for the cultural industry where more than 5 million persons are employed in the 27 Member States. The cultural contents are thus crucial for the growth of the information society feeding indirect other connected markets (such as telecommunications, consumer electronics etc.) and all creative industries.

[11] http://www.nmc.org/pdf/2010-Horizon-Museum.pdf
[12] http://www.nmc.org/pdf/2010-Horizon-Report.pdf
[13] http://ec.europa.eu/culture/our-policy-development/doc/analysis_green_paper.pdf
[14] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:0183:FIN:IT:PDF

5 The Semantic Multimedia Content Management System: MOVIO

This section presents the general features of the MOVIO platform: a Semantic Multimedia Content Management system dedicated to manage and valorise cultural narrations using existing data.

Link to a short video explaining the MOVIO toolkit vision:



https://www.youtube.com/watch?v=JDFXEgmTvB8&feature=youtu.be

After the involvement of cultural curators, researchers and cultural mediators we identified the most relevant user requirements needed to support content (re)use and storytelling approaches to knowledge distribution and valorisation. MOVIO is a Semantic Multimedia Content Management System (SMCMS) that incorporates AthenaPlus generated data and Europeana data. It enables institutions and cultural subjects to create virtual exhibitions and narrations and will include tools to create cultural tourist routes and work around education.
Existing and formatted Europeana Data Model (EDM) data – let it be directly from the Europeana eco-system or directly from content owners who generated EDM formatted data from local content- among other metadata models, will be imported into the MOVIO platform.
MOVIO allows the usage of semantics and the integration and delivery of contents in three selected application contexts: in the first (immediate) version we will use MOVIO for the publication of digital exhibitions (realisation of virtual exhibitions) and next we will enlarge the components to use in educational context and to tourist routes (see chapter 11: Next steps). The generated information will be provided through MOVIO-APP on mobile devices in an optimised way, integrating some external open source APIs (keeping the application licenses unchanged as described in section 7).

The SMCMS MOVIO allows the use of the available formatted information for preparing virtual exhibitions and creating virtual versions of real exhibitions. MOVIO enables a vertical SMCMS specialised in the management of exhibitions: it contains tools, templates, and repositories, designed and developed for a better support to museums, curators and exhibitors. The system gives the opportunity to prepare semantic queries using special relations, and it integrates tools for the management of routes allowing the creation of custom paths. MOVIO supports the creation of ad hoc description cards, provides support functions for the preparation, the enjoyment and the sharing of the virtual exhibition.

The current SMCMS can at the time of writing be used to train cultural institutions and museum personnel such as:

1) **Museum editorial staff** involved in content preparation for the exhibitions;
2) **Museum curator** involved in preparing information cards about the coming real and virtual exhibitions;
3) **Museum marketing team** involved in promoting the exhibitions at the museum (such as community engagement, communication, etc.).

We expect to provide in the future[15] new services supporting education and tourism and involving operators, such as:

4) **Teachers** who will be able to use the tools to integrate and extend their courses;
5) **Students** who will be able to better enrich their learning activities;
6) **Cultural operators** involved in preparing information cards (as example presenting the available exhibitions);
7) **Tour operators** involved in using paths and routes to enrich their portals;
8) **Cultural and education mediators** (associations, local authorities, schools) involved in integrating data provided by the system with information related to the area.

[15] As written in the D5.2 Addendum, a new significant release of the MOVIO environment, containing more of the must-have requirements, is foreseen in June 2013. Through a process of continuous iteration, a final release of the tools (also a project milestone) will be realised by the end of the project in M30.

6 MOVIO architecture

This section provides the (technical) description of the MOVIO architecture starting from the Glizy Framework and the external modules currently used.

6.1 The Glizy framework

Glizy is an open source framework implemented using PHP and maintained by META. This framework is object oriented and aims at providing a layered approach. As shown in Figure 1, Glizy will manage the interaction among the presentation layer (namely the front-end), the publishing layer (namely the back-end interfaces and services) and the data layer (the back-end data storage and management).

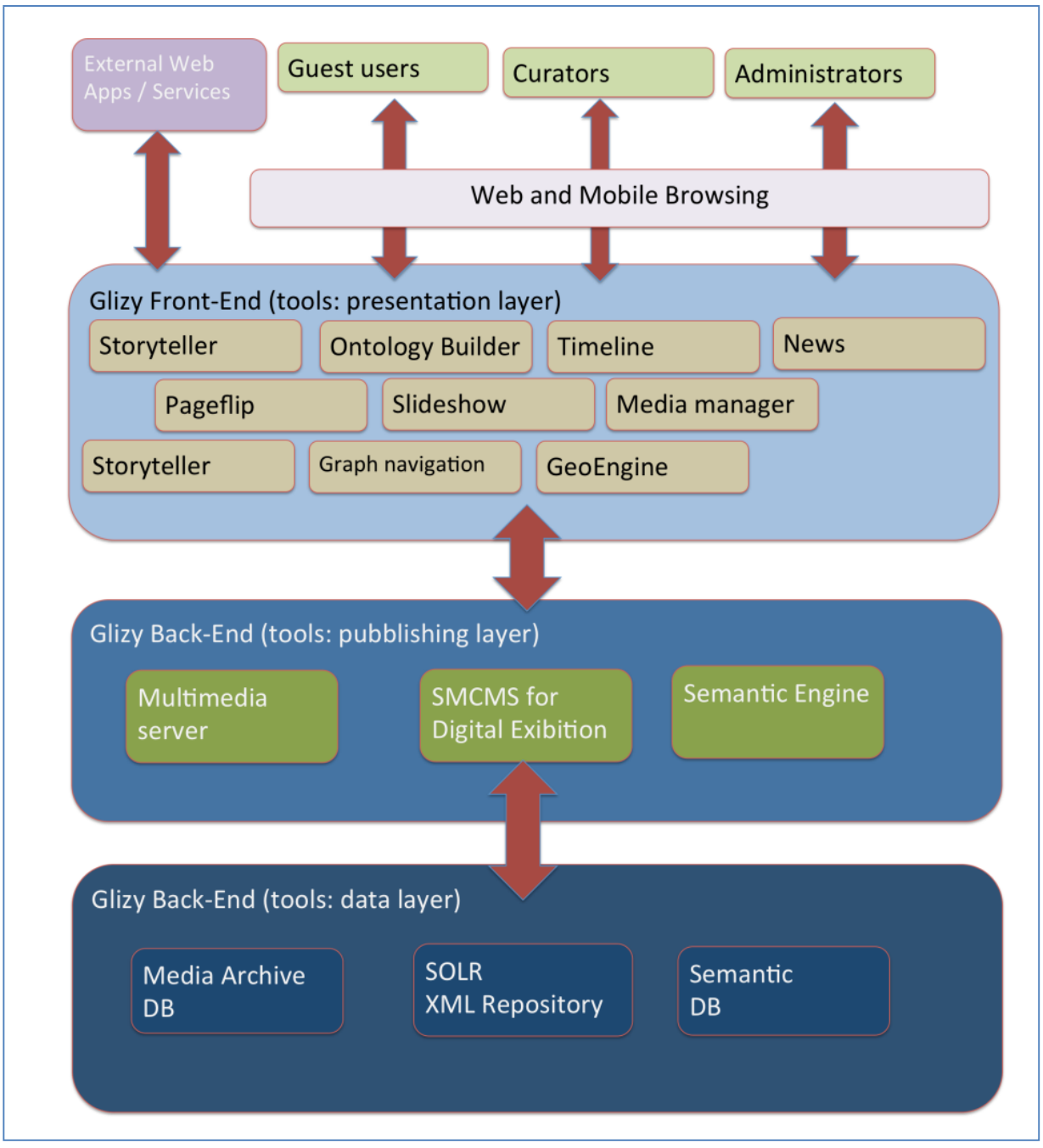


Figure 1: MOVIO conceptual architecture, Glizy framework.

Glizy is a customizable platform, very flexible and scalable, that allows developers to add new modules and to modify the existing ones by creating new functional classes and templates. As anticipated, Glizy is an object-oriented framework and it allows the creation of elementary operations.
Other important advantages of the Glizy framework are:

- Glizy allows defining the pages presentation by means of an XML, which specifies the front-end components.
- The configuration XML administrates automatically the interface content presentation.
- Same DB mapping methods using the same XML syntax.
- Each component can have a different skin (also created externally).
- The languages used currently for the creation of the templates are PHPTAL and TAL.
- The system can be extended by adding new XML definitions, which will be automatically recognised.
- The system manages centrally the generation of URLs, the media content and the links of the pages.
- The output pages can be modelled and you can create output filters to be responsive to the user devices (for example HTML5, mobile XHTML, wrap, etc.).
- The XHTML pages are compliant to the Italian regulation on accessibility (L. 04/2004).

The communication among the different layers of Glizy is performed through special object types, which act as containers and data descriptors. Web Services methods can be published and internal Glizy services can be activated inside the framework (in this case the layer communication is performed through messaging with the following methods: *events, observers, listeners*).
Glizy's services are built to be independent so that they can be activated or disabled and it will be possible to develop additional services without the need to modify the existing architecture.
Glizy framework is based on the 'design pattern' model and thus different services will be added as plug-ins to the existing architecture following a Service Oriented Architecture approach (SOA).

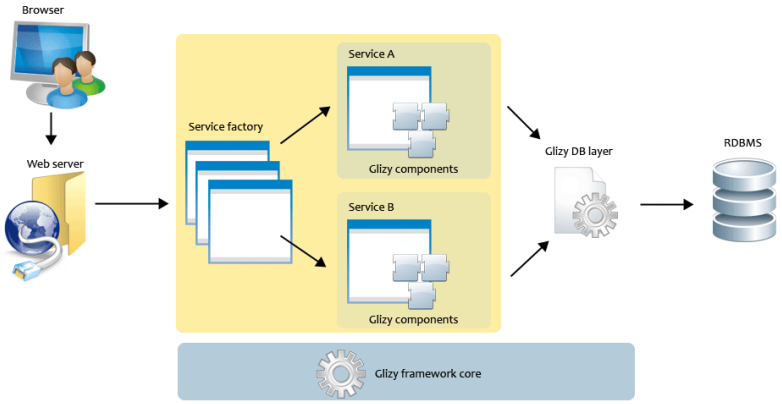


Figure 2: The user interaction with internal data.

MOVIO maintains a strict separation between the content and the content visualisation:

- All textual data is stored in a relational database.
- All binary content, such as images, WORD documents, PDF files, etc., are recorded in a specific table of the database while the binary files are stored in a protected folder which can be virtualized in the server.

The framework and the user will interact in the following way:

- User Request
- Controller/s activate the services
- Answer
- User Feedback (if provided)

- User Feedback management

This approach is typically web based and it is a multi-tier method requiring the collaboration of:

- Browser
- Web server
- Application services, developed on the *Glizy* framework and integrated into MOVIO
- Data check managed by the *DB layer* of the *Glizy framework*
- Database server

6.2 Pages creation

The MOVIO pages are dynamically compiled and created starting from the Page Type[16] defined by the administrator as shown by the following picture:

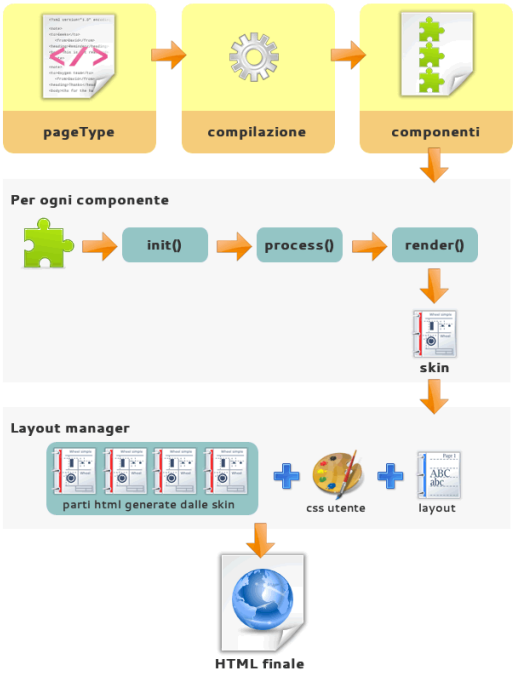


Figure 3: Creation of the pages starting from the Page Types.

As a consequence, the MOVIO pages are not static and to change any page, you just need to change a configuration XML representation of that page or that model page (let it be the gallery, the exhibition page, etc.).

6.3 Glizy technical requirements

Glizy is made up of the following open source components:

- Operating System:
  - Linux
- Other required software to be installed in conjunction to activate:
  - Web Server: Apache 2.2 or newer
  - RDBMS: MySQL 5.1 or newer
  - PHP: 5.3
- PHP Extensions:
  - PDO
  - PDO_MYSQL

[16] To understand the logics of a Page Type, please refer to Annex 4 (Manuals), as it contains a dedicated manual on the creation of a new page based on the preset Page Type.

- DOM
- LIBXML
- JSON
- GD Lib

6.4 Installation and/or access to a working instance

As previously described in order to install the MOVIO platform the following requirements must be satisfied:

Operating System: Linux
Other required software to be installed in conjunction to activate:
Web Server: Apache 2.2 or newer
RDBMS: MySQL 5.1 or newer
PHP: 5.3
PHP Extensions:
PDO,
PDO_MYSQL
DOM
LIBXML
JSON
GD Lib

	Moreover, a new installation of the current release may be installed. Please, download the code at the following URL: http://beta.movio.gruppometa.it/movio.zip
	A working and ready installed instance of MOVIO has been activated for the evaluation of the platform: A test instance of MOVIO for AthenaPlus is available at the following URL. Back-End: http://beta.movio.gruppometa.it/movio/admin/ Front-End: http://beta.movio.gruppometa.it/movio/ For the back-end (administration panel), the access keys are: Username: admin Password; admin

7 License models

This section describes the license model of MOVIO and the license of each of the modules cited in the architecture section and external components (Google APIs, etc.)

The MOVIO license model has been chosen with the objective to allow any subject to take it, modify it and redistribute it respecting its open source nature (which does not limit the exploitation opportunities nor use). This also means that any additional components that will be integrated (i.e. regarding education and tourism), should be created in such a way that they are also open source components and their usage rights do not conflict with the license conditions applied to MOVIO. This way, the entire layer of available AthenaPlus tools will be available in an accessible way.

7.1 MOVIO License model

The MIT License[17] is a free software license originating from the American Massachusetts Institute of Technology (MIT). It is a '*permissive free software license'*: the MIT license allows reuse (even commercial reuse) within proprietary software provided all copies of the licensed software include a copy of the MIT License terms. Such proprietary software retains its proprietary nature even though it incorporates software under the MIT License.

7.2 License Compatibility

The MIT license is GPL-compatible: the GPL permits combination and redistribution with software that uses the MIT License. For more details visit: https://tldrlegal.com/

7.3 License terms

Here we report the license terms of MOVIO (MIT license) evidencing its simple and clear statement.

Copyright (C) <2014> <GruppoMeta>

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

7.4 External licenses (Google, etc.)

MOVIO does not require licensing third parties software, as it is not embedding external code: MOVIO connects to free for use APIs (such as Google Map or timeline). As a consequence, it is not required any further licensing about these applications and tools. We did not include other tools, even if sometimes it would have been appreciated, because of the licence compatibility issues. In fact most other available tools are not under MIT license.

[17] http://opensource.org/licenses/MIT

8 MOVIO tools

This section presents some of the most important MOVIO tools with examples about how to create virtual exhibitions. The section introduces the back-end and the front-end and the design aspects of the tools. Further practical details on how to realise exhibitions and narrations can be found in the APPENDIX 4: MOVIO handbooks**.**

The back-end of MOVIO is the area dedicated to populate and annotate the media archive and through it to create the pages and the narration to be published online. Some of the activities offered are:

- Choose the language for the media which you are going to add to the media archive
- Manage the multilingualism of the collections
- Manage the graphical templates
- Provision of a 'page content management': the user can manage directly the MENU of the DE and the association to the different modules of the platform and existing page types (such as timeline, mapping, slideshow, etc.)
- Manage the user profiles and the users
- Manage the media archive
- Modify and personalise the page types
- Manage different services
- The pages can be personalised and the curator may choose different solutions using:
    - Traditional HTML pages
    - Different photographic galleries visualisation models like slide show
    - Zoom images
    - Create a time-line
    - Create interactive mappings
    - Create hotspots on images
    - Create and manage the ontologies for a better access to cultural content collections
    - Create a full storyteller
    - Create internal search tool
- Manage interoperability functions
- Manage community functionalities
- Optimise the meta-tags for SEO

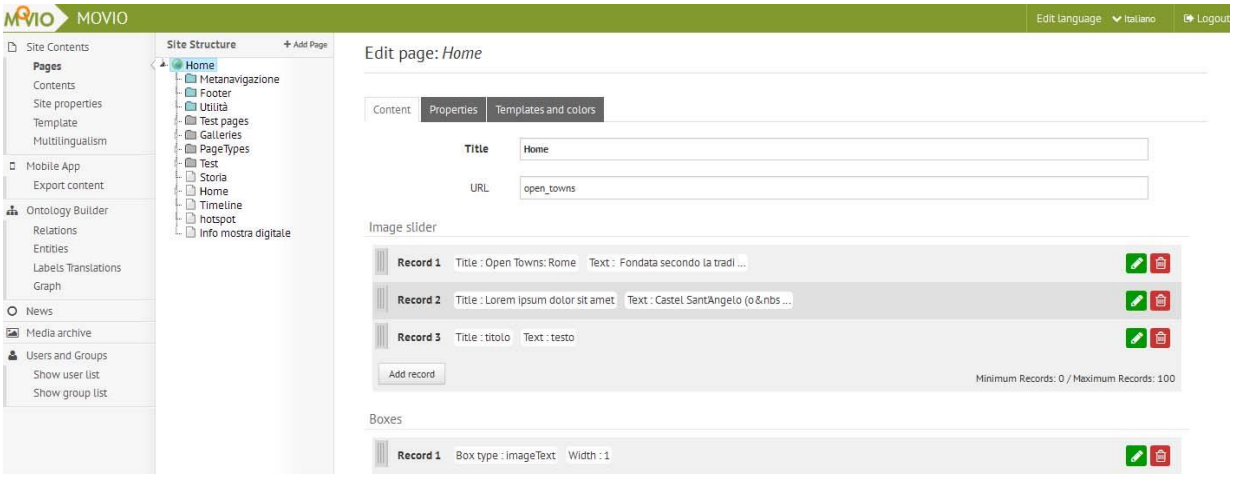


Figure 4: MOVIO Back-end interface.

8.1 The Ontology Builder tool

Leaving the model where the curators used a straight linear corridor of narration, now thematic paths can be created instead, correlating content items and personalising the content fruition. The Ontology Builder is the tool for managing the conceptual map of the contents to be published, creating relations among the Entities (to which the curator may associate documents, images and other media). The Relations between Entities are expressed by verbs: this guarantees the correctness of the logical path connecting them. The curator will first draw by hand a draft conceptual map of Entities and Relations in the semantic domain of the DE (not in MOVIO). As soon as the conceptual map has been defined, the curator will start to use MOVIO creating the relations first and the entities later, in order to translate his drawing or design into an online infrastructure which then renders the requested relations. The final result of the map can be visualised by the curator (from the back-end) and by the end user from the front-end (see next Figure 5).

The user can access the list of the contents represented by an Entity, simply by clicking on it. Each content item can then be navigated in terms of description and eventually be played (e.g. for videos). The curator creates cards and descriptions thanks to the Module Builder that allows the curator to create metadata describing the content of the Entity and include textual description, photographic galleries, visual media play, etc.

The following figure shows an example using the DE: starting from the previous conceptual map, the entity named ‘Architects”) is linked to the entity “Settings” through the relation ‘give shape to’. Next figure (figure 6) shows the content assigned to the entity “Set up” (‘Allestimento’) of the Bagpipe Museum, described by a short text and a gallery of pictures. The semantic relations, created using the Ontology Builder, are the paths that guide to the content items of the different entities related one another (such as the card of the architect who realised this particular set-up).

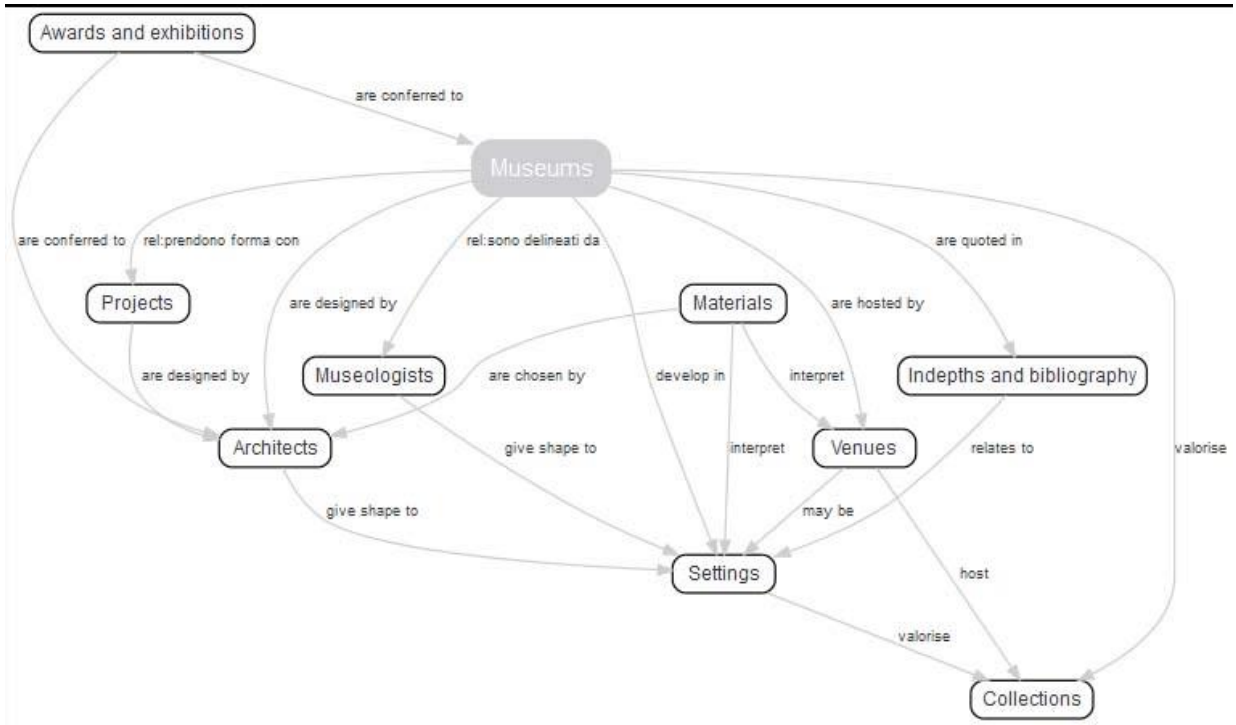


Figure 5: Example of how a conceptual map can be created through the Ontology Builder in MOVIO SMCMS (Regione Lazio experimented the Italian version of MOVIO).

The specific way in which the Ontology Builder works, allows for two things:

- Visualisation of relations and a new way of navigating the content;
- Providing in-depth information on a certain topic or subject (in this example; when looking at who created a specific set-up, you do not only see the name of the architect who made it but can click through on this – learning more about this specific architect or its company/organisation.

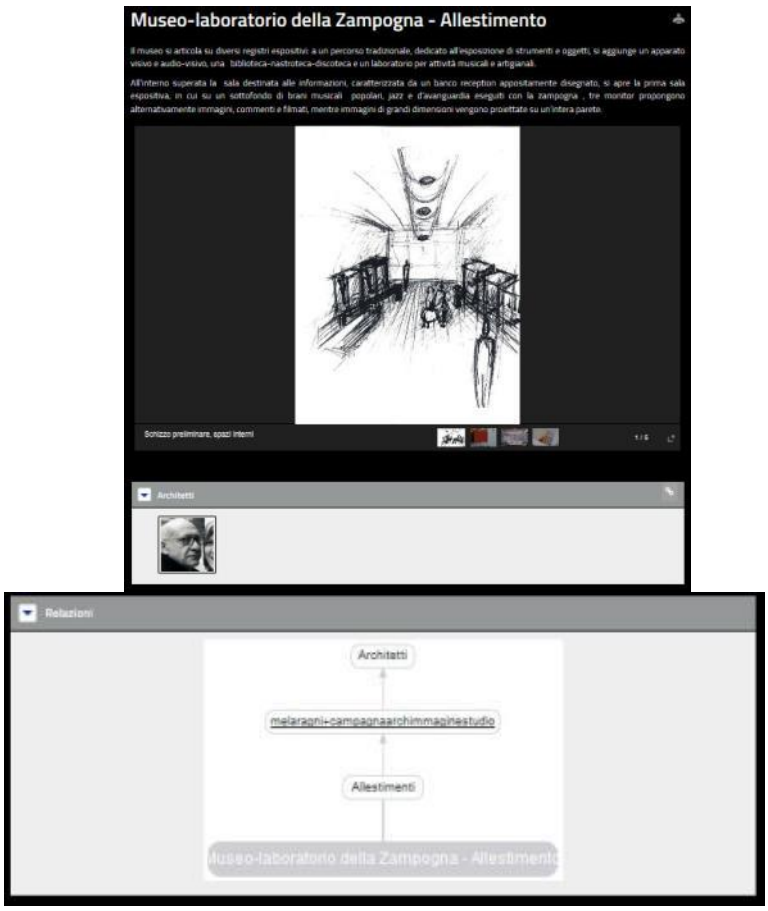


Figure 6: Example of a document (currently only in Italian) created using the Ontology Builder with the relation to another entity, and the model of relations.

8.2 The Storyteller

The storyteller is an instrument to narrate stories. There are three main ingredients of the storytelling: the story (in DE we use digital media contents); the author/storyteller (in the case of DE this role is performed by the curator); and the public (who will read, listen and interact socially commenting, etc.). As such, the MOVIO SMCMS is the most adequate instrument for having a digital continuation of the storytelling tradition with the added value of public direct involvement. To best follow the storytelling process, we decided to design a vertical sequence template, which presents on the narration line texts, video, images, etc.
In-depth contents will be linked by means of the Ontology Builder and as same as in Blogs, each narration item has a permalink to be quoted or shared as a single relevant piece of knowledge on other platforms.

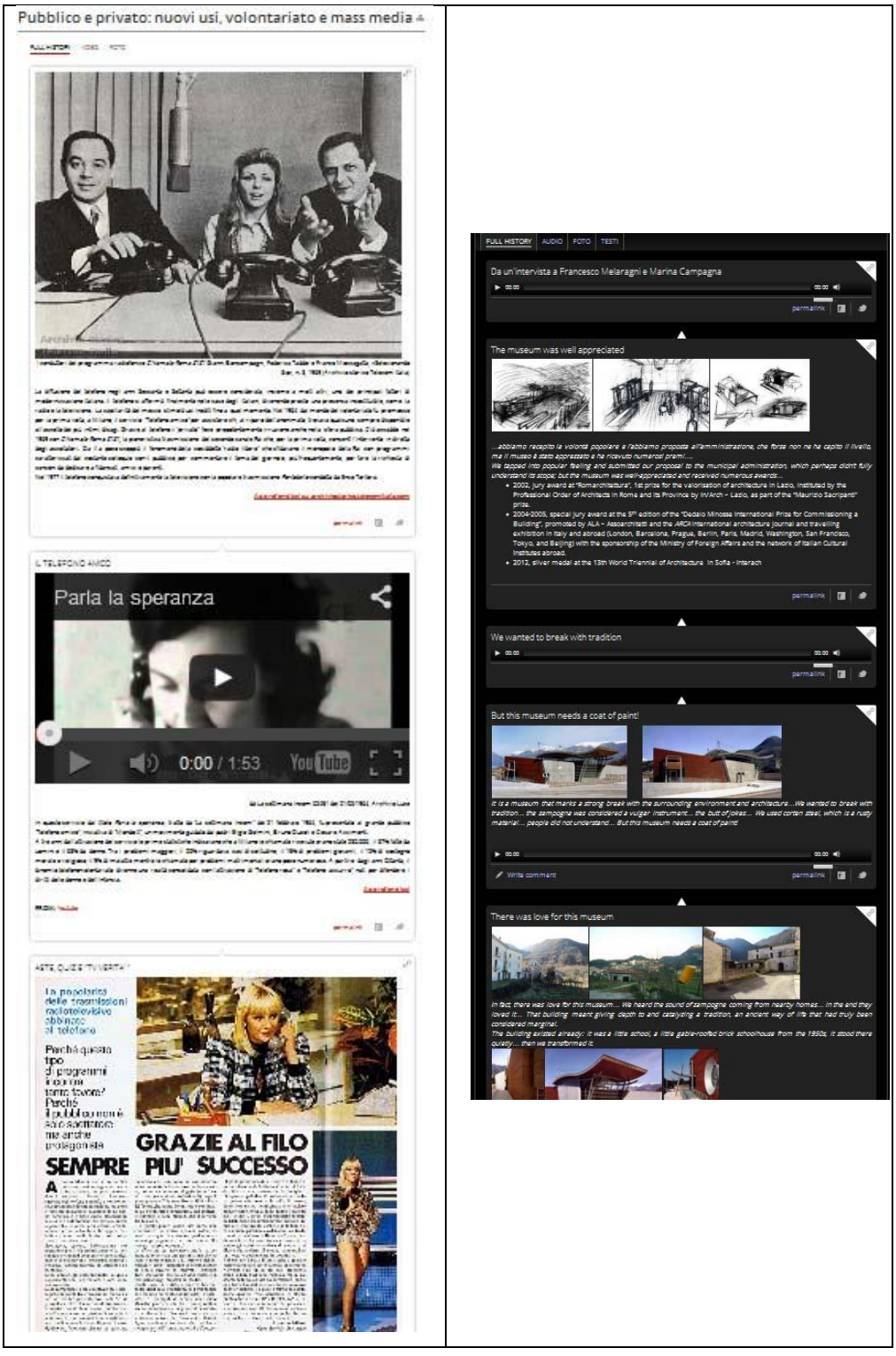


Figure 7: Mock-ups of the components of a narration in the storyteller module.

8.3 Hot Spots

The Hot Spot functionality allows the association of sections of an image to additional information or external resources on the web.

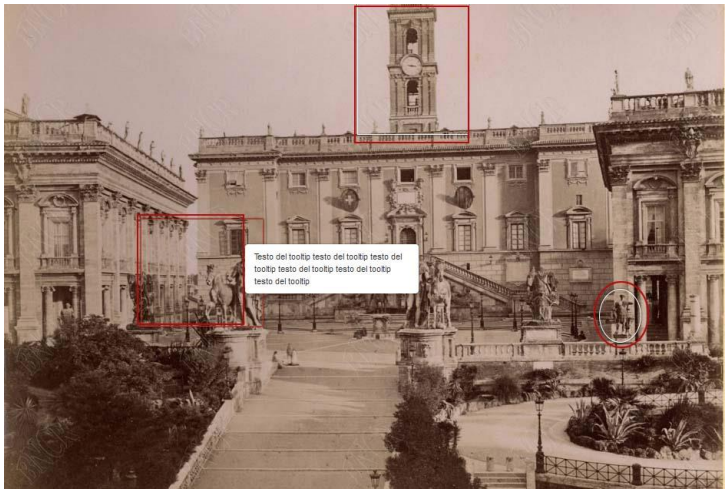


Figure 8: Example of an image with hot-spots

8.4 Digital exhibition pages

The PageType Digital Exhibition allows the creation of a digital exhibition file to illustrate the details of the realisation; it provides a type of meta-information about the exhibition (content, topic, organisation practical info, etc.).

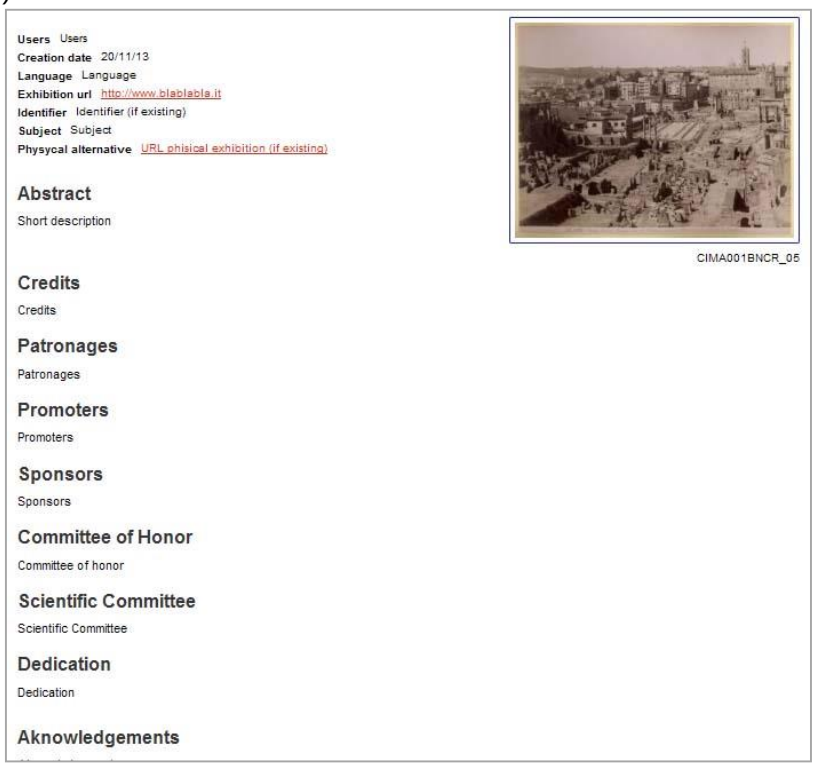


Figure 9: A sample page of a digital exhibition.

8.5 A catalogue of digital exhibitions

Each DE may have a descriptive form to be filled (similar to the card which describes the real exhibition), including an identification reference, a title and an author (the curator). The card describing the DE is useful both for the curator and for the end user who will access soon to a 'library of DE'. This is the future evolution of MOVIO: MOVIO-HUB will collect all information about the developed DE and offer them to

the users on a virtual hub. This way a structured overview of all available DE can be given in one clear overview.
This descriptive form in MOVIO is structured taking into account the inputs given by the working group on digital exhibitions made up of experts from Germany, Greece, Israel, Italy, Poland, Sweden, and Hungary; this group was set up in 2010 and continued working within the Linked Heritage and AthenaPlus projects [18].



Figure 10: Example of the card of a DE, using the Italian version of MOVIO.

8.6 Slideshow

The Slideshow tool allows the curator to create a sequential or a matrix based slide presentation of the visual content taken from the Media Archive of MOVIO.



PhotoGallery: showing the thumbnails of the collection in the frame



Slide Show: images change on a time basis



Slider: on the right corner you can choose which slide to look at



Page Flip: the user can turn the pages

Figure 11: Examples of a slideshow visualisation mode.

[18] The working group analysed and monitored best practices in the specific domain of cultural digital exhibitions: http://museumsdokumentation.de/joomla/.

8.7 Mapping tool

MOVIO embeds the Google Maps API[19], empowered by jmaps.js[20] interactive service to graphically display a Point of Interest (POI) on a map.

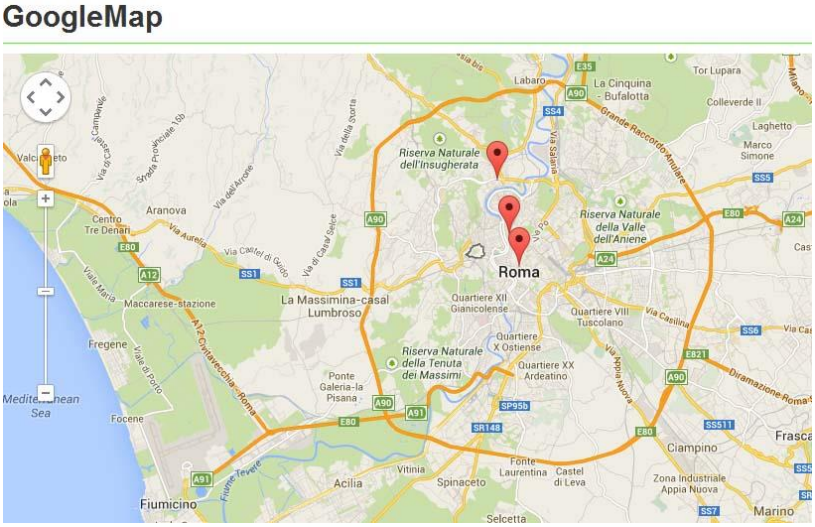


Figure 12: the Google mapping APIs integrated as a tool.

8.8 The timeline

MOVIO integrates as timeline generator the VERITE APIs[21] (for more details see the timeline tutorial, section 16: annex 4): the user can select the date to which connect an item selected from the Media Archive and add a presentation text as shown by the next figure.

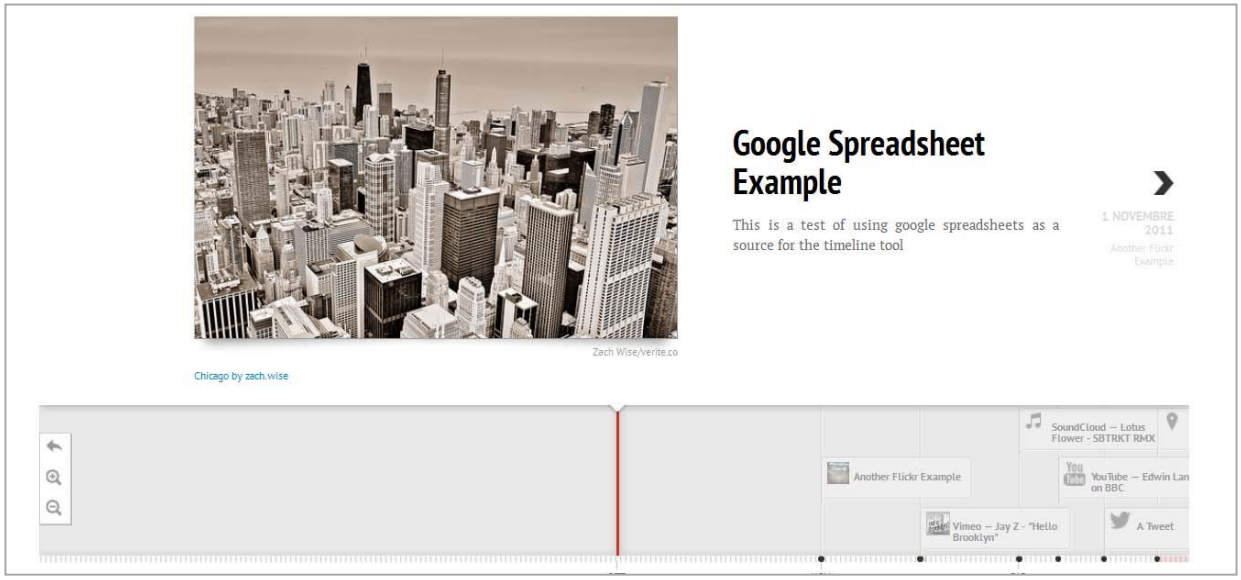


Figure 13: Example of a timeline application.

[19] https://developers.google.com/maps/.
[20] http://hpneo.github.com/gmaps/.
[21] http://timeline.verite.co/,

9 From the requirements to MOVIO realized tools

This section provides a mapping table with the selection of tools answering to the requirements identified in the Addendum to D5.2 and planned to be released together with this deliverable.

As expressed in the Addendum to D5.2, here we report the delivery of the tools for the customisation of MOVIO according to the requirements expressed by the AthenaPlus community scheduled by February 2014 (the remaining tools were scheduled by end June 2014 and end October 2014): the list of tools and functionalities is listed in the following Table 1.

Sequential Id	User Actions	Detailed description	Implementation notes	Due time	Front end/Back end	Modules involved	Application fields: All, Education, Cultural mediation, Tourism	Domain
MOV-AP-00006	Historical map	A map that shows information of historical relevance: places, events, etc.	Hot spot editor in MOVIO	28 Feb. 2014	B	B	a	tool
MOV-AP-00008	Anonymous access (the user just navigates the content, can't save paths, nor share…)	Access without registration and without authentication	No Login	28 Feb. 2014	F	F	a	user profile
MOV-AP-00014	Geographical map	A map that shows information of places, routes, etc. (i.e. Like Google Map)	This function is just implemented in the map page of MOVIO	28 Feb. 2014	F	F	a	tool
MOV-AP-00015	Timeline	A linear line on which the dates are represented in a sequential order	This function is just implemented in the timeline page of MOVIO	28 Feb. 2014	F	F	a	tool
MOV-AP-00016	Combine areas (+)	Possibility to collect different categories in one presentation page: textual descriptions, video, etc. The areas are expressed as media type. As example, the writers describe and tell their narration (text), the video editor creates short recordings, the interviewer records some interviews, etc.	This function is just implemented in the Storytelling page of MOVIO	28 Feb. 2014	F	F	a	tool

		and each of them collect their media in their area: finally the curator combines the contributions in a 'combined area' selecting the most appropriate of them for the narration.						
MOV-AP-00025	Leave a comment	Possibility to write (only for authenticated users) a comment and publish it in relation to an article or narration (i.e. 'I've visited also the real exhibition and this article attracted me to visit it, thanks!")	Only in the storyteller	28 Feb. 2014	F	F	a	user profile
MOV-AP-00059	Consent form for privacy	The consent form is mandatory for some countries to manage personal data (such as in Italy)	Text area	28 Feb. 2014	F	F	a	user profile
MOV-AP-00062	Free keyword search	The possibility to search using a Google-like search box	Google-like search	28 Feb. 2014	F	F	a	tool
MOV-AP-00065	Zoom-in image	The possibility to zoom in large pictures (such as paintings to see the very tiny detail of a cloth or a jewel	Zoom - in	28 Feb. 2014	F	F	a	tool
MOV-AP-00066	Zoom-out image	The possibility to zoom out large pictures after you zoomed in (such as paintings to see the very tiny detail of a cloth or a jewel	Zoom - out	28 Feb. 2014	F	F	a	tool
MOV-AP-00106	Preview	Possibility to visualize an action (i.e. after editing it)	Preview in the back-end	28 Feb. 2014	B	B	a	gui
MOV-AP-00107	Viewable and available collections	Some exhibitions are published and some (in progress) are at a draft state and are not made public. This means that some content is	Editing workflow	28 Feb. 2014	B	B	a	gui

		made visible to the community and some others are 'private'.						
MOV-AP-00110	Text area	Editing area for textual content	The text block of MOVIO CMS	28 Feb. 2014	B	B	a	tool
MOV-AP-00111	Picture area	Editing area for images	You can resize an image when you insert it in the text	28 Feb. 2014	B	B	a	tool
MOV-AP-00122	Video	Possibility to show videos on the interface	The possibility to show video in any interface	28 Feb. 2014	F	F	a	content
MOV-AP-00128	Permalink generation	Possibility to generate a permanent link to a small self explaining content (i.e. a painting)	MOVIO generates a permalink associated to the internal resources	28 Feb. 2014	F	F	a	tool
MOV-AP-00132	Create a navigation ontology	Possibility to create an ontology, which is then used by the user to navigate the content. It is like creating a museum route in the narration.	Ontology builder	28 Feb. 2014	B	B	c	tool
MOV-AP-00147	Slideshow layer	Possibility to generate a slideshow	Slideshow tool of MOVIO	28 Feb. 2014	F	B/F	a	tool
MOV-AP-00148	Edit/modify	Possibility to modify what is on the page	Using the Content management of MOVIO	28 Feb. 2014	B	B	a	tool
MOV-AP-00153	Provision of the exhibition information	Possibility to provide information about the real exhibition (opening time, location, map to the museum, tickets, etc.	Exhibition module	28 Feb. 2014	F	B/F	a	content
MOV-AP-00171	Modify ontology	Possibility to modify at any time an ontology, let it be created by the curator	Ontology editor	28 Feb. 2014	B	B	e,c	tool
MOV-AP-00176	Create ontology element	Possibility to create elementary ontologies which can be then used and combined in more complex ontologies (atoms and molecules)	Entity editor, content editor	28 Feb. 2014	B	B	e,c	tool

MOV-AP-00177	Create hierarchy	Possibility to define a hierarchical structure in the ontology	Relation editor	28 Feb. 2014	B	B	e,c	tool
MOV-AP-00178	Create ontology relationship	Possibility to create the relations in the ontology	Relation editor	28 Feb. 2014	B	B	e,c	tool
MOV-AP-00184	Multilinguistic	Possibility to add new languages	Multilingual	28 Feb. 2014	B	B/F	a	Tool
MOV-AP-00186	Image gallery	Possibility to create an image repository or gallery (CMS)		28 Feb. 2014			a	Tool
MOV-AP-00187	Storytelling	Possibility to organize and edit content in order to create a story and a narration	There is the page type gallery in the back-end	28 Feb. 2014	B/F	B/F	a	Tool
MOV-AP-00188	Template configuration	Possibility to modify the structure of the page: Colours and the king of the layout (e.g.: two or more columns)	Template configuration in MOVIO CMS	28 Feb. 2014	B	B	a	Tool
MOV-AP-00189	Template independent	Possibility to use other templates and not only the standard	Framework feature of MOVIO that permit the substitution of the graphic elements	28 Feb. 2014	D	D	a	Tool
MOV-AP-00191	DAM	Data Asset Management: allows the content owner to create collections and manage media and link them in the pages	Media Archive	28 Feb. 2014	F	B/F	a	Tool
MOV-AP-00018	Build virtual exhibition	Possibility to create complete virtual and digital exhibitions in relation to the building of a museum: i.e. room1: pop-art (here the narration of the room and the works of art); room2: Andy Warhol (here a dedicated room to AW, paintings, and descriptions)... This would support both fully virtual and real exhibitions	This action may be done by the curator in MOVIO using a map of the museum and create hotspot in it that refer some contents	28 Feb. 2014	B	B/ F	c	tool

MOV-AP-00064	Add picture	Possibility to upload or link an image to a page or a narration area	Add an image in media archive	28 Feb. 2014	B	B	a	content
MOV-AP-00067	Add video	Possibility to upload or link an video to a page or a narration area	Add a video in media archive	28 Feb. 2014	B	B	a	content
MOV-AP-00068	Add audio	Possibility to upload or link an video to a page or a narration area	Add an audio in media archive	28 Feb. 2014	B	B	a	content
MOV-AP-00076	Add text	Possibility to edit a text area or a narration area	Add a text in the CMS and edit it	28 Feb. 2014	B	B	a	content
MOV-AP-00118	WYSIWYG editor	WYSIWYG text editor	This is the editing tool of MOVIO	28 Feb. 2014			a	tool
MOV-AP-00077	Put markers on the map	Possibility to link a map and add relevant locations remaking them	Create a Poi on a Google Map in the MOVIO map page	28 Feb. 2014	B	B	a	tool
MOV-AP-00134	Add external resources reference to be ingested	Possibility to add owned content by upload or other web available resources (i.e. through the link to the resources)	In the BE of MOCIO we can upload resource in the archive media and link external source, such as YouTube videos	28 Feb. 2014	B	B	a	tool
MOV-AP-00146	Connect element to	Possibility to connect one element in the narration to the elements or tools (as example a content to a page); text to video, etc.	Possibility of use of URL of contents to insert it in a page	28 Feb. 2014	F	B/F	c	tool
MOV-AP-00088	Referred links (internal and external)	Possibility to add to a narration links to terms. These links my be provided from internal sources (the narrations or their parts of the same story) or may come from external resources, such as dictionaries	In the MOVIO COM there is the possibility to edit a link in the text to external resource	28 Feb. 2014	B	B/F	a	user profile
MOV-AP-00096	QR code linked data	Possibility to connect content published on MOVIO to QR code recognition	This is a functionality in the mobile app	28 Feb. 2014	F	B/F	c	tool

MOV-AP-00099	Read a QR code and show a multimedia content	Possibility to retrieve a web page of MOVIO by reading a QR code	This is a functionality in the mobile app	28 Feb. 2014			c	tool

Table 1: MOVIO tools and functionalities released by end February 2014.

The following **MOV-AP-00150** has not been released yet: it is going to be finalized in a short time.

Sequential Id	**User Actions**	**Detailed description**	**Implementation notes**	**Due time**	**Front end/Back end**	**Modules involved**	**Application fields: All, Education, Cultural mediation, Tourism**	**Domain**
MOV-AP-00150	Combine: slideshow + audio + video + text 2 voice	Possibility to put in the same narration and organize the order of content different media types	This is possible in the Storytelling and content pages	28 Feb. 2014	B	B/F	a	tool

Table 2: MOVIO tools and functionalities under finalization.

10 Real cases applications

This section presents a gallery of real users who already adopted the MOVIO platform and tools and published their narrations and those who are building their digital exhibitions.

While the training sessions are going to start for the AthenaPlus project, some Italian institutions and private organisations already published some graceful websites and have personalized the Italian MOVIO instance: the Fondazione Telecom Italia[22], the Biblioteca Universitaria Alessandrina[23], the Museo Centrale del Risorgimento[24] and the Regione Lazio have already released their own virtual exhibitions using MOVIO. The testing phase of the MOVIO instance for all AthenaPlus partners is about to start (month 14).

As some of the abovementioned organisations have not yet fully finished their exhibition, we only highlight one specific case.

10.1 UNIMORE (UNIversità degli studi di MOdena e Reggio Emilia): an EDUCATIONAL case

After the Berlin Workshop in October 2013, a professor of the University of Modena and Reggio Emilia (UNIMORE) asked the AthenaPlus project coordinator to have access to the MOVIO[25] platform and be allowed to use it immediately; this was made possible thanks to the signature of a Cooperation Agreement between AthenaPlus and UNIMORE. UNIMORE in less than a month has installed and published a website collecting materials on its educational services. This instance of MOVIO was personalised with thumbnail-videos activated in the front page which were not in the default code set. This shows how easy and flexible the current platform is and how immediate interest it can capture.



Figure 14: The new MOVIO-based portal published by UNIMORE.

[22] Link: http://www.litaliachiamo.it
[23] Link: http://movio.beniculturali.it/bua/societasindacatopolitica
[24] Link: http://movio.beniculturali.it/mcrr/immaginidellagrandeguerra
[25] Link: http://54.247.69.120/build/movio/unimorerobotica/



Figure 15: Educational pages of the UNIMORE web site.

11 Next steps

In this section, we illustrate the other components to be developed as part of the AthenaPlus creative tools. on the focus is put on the educational components as these will be the ones that will be released the soonest.

11.1 Planning of further components and expansion of the tools available

In the Addendum to the D5.2 it was announced that:

> *"In order to familiarise the partners with the technical infrastructure, dedicated trainings will be organised from March 2014 onwards. The training materials for these sessions will be developed by PACKED. In April 2014 four national trainings for the 'early adopters' among the project consortium will be organised aimed at museum professionals. Other target groups such as the educational field will be trained later on (starting M20) as that month marks the release of a MOVIO version containing more requirements to fit a broader audience."*

The first dedicated training took place on March 20 2014 in Italy. However, as the delivery of the actual training materials is only scheduled for M14 (planning of D5.4), further trainings will only take place from M15 – i.e. May 2014. At the time of writing, four trainings in four different countries (Sweden, Hungary, Lithuania and Poland, besides Italy) are already scheduled.

As indicated, they are targeted to the museum professionals and will focus on the creation of a digital exhibition. When the next sets of tools is ready (here referred to as 'the next release'), trainings aimed at a broader public will follow.

In the DoW, the following components have been listed:

- A tool allowing for the creation of virtual exhibitions and cultural tourism routes, which will be useful for Task 6.3 (BNCRM, ICIMSS, ILS, LAM, RA, PIM, ICCU, HMTC).
    - This need is covered by the current instance of MOVIO. An extension specifically on tourism will follow.
- An environment that will facilitate digital storytelling (made by Dédale) to be used in Task 6.2.
    - This tool is made available by Dédale and will follow in the second release
- A tool involving GIS components applied to digital cultural heritage for Task 6.3 (made by IPCHS).
    - This tool is made available by IPCHS and will follow in the second release

Moreover, according to the DoW, the AthenaPlus tools should also facilitate re-use of digital heritage content for educational purposes. WP5-partner PACKED vzw will therefore deliver education-oriented tools that can be used in such context. These are highlighted in the following paragraph. The tools will be released in a first version in June 2014, and will be fully operational in September 2014 (at the start of the next school year).

In order to inform the project partners, external interested stakeholders, users and the Commission/external reviewing panel, we propose to include an addendum to this deliverable on the release of the other set of tools and the expansion of the MOVIO platform.

- **This deliverable (D5.3) was originally scheduled at M12 but after having informed the Commission, it is delivered one month later in order to include the feedback of the latest plenary meeting in Bucharest.**
- **Therefore, we propose an addendum to this deliverable, scheduled in M20 which describes an update of the status of developments, the new applications that have become available, and an eventual look into some of the realised products (e.g. digital exhibitions or practice in education).**
- **The final deliverable (D5.5), scheduled at the very end of the project, will then report on the final status of the results of the work in WP5.**

We believe that, by including this addendum, the progress on the development of the AthenaPlus tools will be easier to be monitored, and will provide a clear overview of the available components.

11.2 Educational toolbox

The expertise on creating exhibitions and translating them into the online world is a set of skills that is present in the current AthenaPlus consortium. Most of the project partners work with their collections in this way on a daily basis. Creating meaningful applications in order to present cultural heritage in an educational way required a bit more research and diligent preparation. This is why the technical finalisation of the educational components of the AthenaPlus tools is not delivered in parallel to the virtual exhibition tool.



Figure 16: Slide from the WP5 meeting during the Bucharest plenary in March 2014.

After the plenary meeting held in October 2013 in Berlin, it was decided among the WP5, WP6 and related working groups that we would take an approach in different phases. The technical work on the educational components would start when the work on the virtual exhibition tool had progressed to a degree where a first version of the tool was ready to launch. This way, the pilot actions can also be started in a more gradual way and become easier to monitor (i.e. first round of pilots will work on virtual exhibitions, second round will focus on educational use, and third round on the re-use in tourism).

In this section, we present the outline of the educational components currently under development. A first version of the tools will be released in June 2014. Although this first iteration in the development cycle, consisting of an elaborated analysis, design, development of the tools will only take 3 months, they will be fully functional but could contain some rough edges. Based on tests and comments, a second refined version will be released by September 2014 so that they can be used from the start of the new school year.

11.2.1 The decision-making process

Digital cultural heritage in relation to education is a trending topic. Several European(a) projects are working on it, fully or in part; AthenaPlus, EuropeanaCreative and EuropeanaSpace, Historiana, also in single institutions the way the educational (digital) policy is perceived, is changing.

The decisions to be taken on which path to follow for the developments of educational components, could thus not be taken in a vacuum. After some desk research and meetings with different stakeholders, five ideas for new components were proposed to the WP5 Working Group (see table below).
The members were asked to:

- Rank their top three components and give them a score from 1 to 3;
- Provide initial thoughts on the proposals;
- Add their own idea for a component to be developed (if applicable).

Nr.	Modules	Description	Platform	Learning objective	Aimed at

1	Comprehensive reading + tagging game	The teacher gathers (in communication with the CH institution or independently) information on a certain CH topic and creates a text in a foreign language. The text is subject of a comprehensive reading-class. When the text is read by the students, they can enter a tagging game based on images that are related to the subject of the text. If they have understood the text, the items will be tagged correctly. The game can be made against the clock, against each other, in team, ...	Website	Understanding another language by means of cultural heritage	Age 6-18
2	Quiz programme to accompany real-life exhibition (and possibly also virtual exhibition)	Real exhibition: quiz can be undertaken as exploration (i.e. free visit to the exhibition) or in the aftermath of a guided tour through the exhibition. Based on the content in the exhibition, a quiz-like programme on mobile devices is created (e.g. now move to the place where you saw xyz, then a puzzle is solved or questions are answered). The answers that the player indicates on the iPad are stored in a database so that the educational staff member or accompanying teacher can work with them.	iPad or other mobile device	Digest the information from a real-life exhibition in a playful way	Everyone (different version for student -any ages, incl. higher edu- or regular vistor)
3	Map of Europe + 100 years back in time	Starting from a map of Europe, several aspects of European life then and/or now could be popping up from the map and clickable for further info. Here also the Europeana API is prominently integrated as we propose a feature '100 years back in time', where it would be possible to click the button and see what that day 100 years earlier was happening in Europe (based on pre-set search).	Smartboard application	Learn about Europe (current-history-arts) in a visually attractive way that encompasses multiple edu facets (i.e. history+geography +arts+society+ ...)	Age 10-12
4	Preparation of school trip with focus on content to visit	Assuming that almost every school in the final year undertakes a trip to Paris, Florence, Rome, ... this feature in MOVIO would allow students (e.g. in small groups) to plan their trip - instead of the teacher giving them all information. They'd have a budget assigned, would need to look up proper hotels, figure out transport, check hours and practical info on heritage sites and other cultural institutions, and make an overview of what CH they are going to see there in real life (making use of digital reproductions). This should get the form of an assignment by the teacher.	MOVIO	Cross-domain small group assignment where they need to be actively involved in the trip and do their own preparations (as if they were real). Making the link with the real world, and having a thorough preparation of what kind of heritage they are about to encounter.	Age 16-18
5	City quest: unknown heritage	In many cities or communities, museums, small archives, ... are at work. Often even their existence is unknown to people living, studying or working in that place or area. An application is provided to work with the collection held in that institution and geodata to make a city quest in the neighbourhood, about the heritage held in that institution. Mobile devices required.	iPad or other mobile device	Creating awareness of the CH institution in the neighbourhood, lowering the barrier of entering it or asking for information + promoting the assets held there (and possible future partnerships)	Everyone (different version for student -any ages, incl. higher edu- or regular visitor)

After a period of two weeks the feedback process was closed, and three components were chosen (numbers 3, 4 and 5 from the table above). The WP5 team organised a technical meeting in Pisa on February 25-26th 2014 in order to align the understanding of the work to be done (on a conceptual and technical level). The work to be undertaken was presented to the broader consortium during the plenary meeting in Bucharest on March 13-14th.

11.2.2 Outline of the components to be developed

1. Plan your own school trip

(Highest ranking by WP5 Working Group)

Almost every school in the final year undertakes a trip to one of the greater historical cities, such as Paris, Florence, Rome, ... This feature in MOVIO would allow students (e.g. in small groups) to plan their trip, from the practical part of it (how to get around in the city? What accommodation will we stay in?) to performing preparatory research on the heritage sites and museums they are about to encounter. The teacher would provide the framework for the task (i.e. have a budget-date-'must see places' assigned) and will evaluate the students' presentation of how they would plan the trip. The students should gather the information they can find (through digital reproductions, source information, video material) in an online environment so that it is presented as a kind of itinerary with background information per specific part of the trip.



Fig 17: Conceptual map of what the component should entail.

2. City quest

(Second ranking by WP5 Working Group)

In many cities or communities, one can find smaller museums or archives. They do not have the visibility of big(ger) institutions, and therefore often even their existence is unknown to the people living, studying or working in that place or area. Their collections often also have a strong link to the place or region the institution is located in. Therefore, an application is provided to work with the collection held in that institution and make a city quest in the neighbourhood, about the heritage held in that institution. This puts the heritage out of its museum context and in the everyday life. After the quest, a visit to the real institution takes place. This application will likely be MOVIO-based, with transfer of the information to the MOVIO-app (mobile devices such as smartphone or tablet required).



Fig 18: Scanning of QR codes during city visit.

3. Map of Europe / 100 years back in time

(Third ranking by WP5 Working Group)

Starting from different maps of Europe, several aspects of European life then and/or now could be popping up from the map and clickable for further info. Here also the Europeana API is prominently integrated as we propose a feature '100 years back in time', where it would be possible to click the button and see what that day 100 years earlier was happening in Europe (based on pre-set search). This application will take the form of a standalone open application, that has the possibility to be integrated (in part or in full) in MOVIO.



Fig 19: Visualisation of different elements of the Maps of Europe-app.

12 CONCLUSIONS

12.1 Results and Impact

The most important result described by this deliverable is the release of the planned toolkit for the AthenaPlus project. This deliverable collected all the information about the MOVIO Semantic Multimedia Content Management System which will be used by AthenaPlus partners to create digital exhibitions and virtual storytelling narrations. The available tools are ready to use and further functionalities are under development on the sort term, according to the user feedbacks and to the planned releases (see the addendum to D5.2).

The next WP5 deliverable (D5.4 Training materials for supporting the use of the AthenaPlus tools) will contain the development of actual training materials as well as the execution of the real-life training sessions on the use of the tools developed in the current deliverable. The manuals written in D5.3 will support the training activities. After the training activities will be executed and partners will start using the MOVIO platform, we will proceed to release a revision of the AthenaPlus tools and will realise the final version of the MOVIO and other AthenaPlus tools. The pilot partner and user's suggestions will permit a continuous and iterative revision of the implemented tools.

As a final result we are going to collect in one unique library all the virtual exhibitions and will make them available through a dedicated application for exhibitions and museums.

12.2 Next steps

The current version of MOVIO supports the museum curators and allows them to create digital exhibitions and narrations. Next activities will address the educational scenario and the tourism scenario including the connection to Europeana APIs and thus to extract and edit locally the Europeana resources.

13 APPENDIX 1: REFERENCES

[1] AthenaPlus Document of Work
[2] 'Report on the user needs and requirements' (D5.1)
[3] 'Report on existing tools and devices related to narrative approaches and requirement functionalities' and the addendum (D5.2)
[4] 'Analysis, scenarios use cases, opportunities of innovative services for DCH, and future development' (D7.2).
[5] Mostre virtuali online: linee guida per la realizzazione, Version 1.0 (Sept. 2011), Roma: MIBAC, 2011, <http://www.otebac.it/index.php?it/320/mostre-virtuali-online-linee-guida-per-la-realizzazione>. See also: Mostre virtuali online. Linee guida per la realizzazione. La genesi di un progetto per il web culturale, DigItalia, Marina Giannetto, 1 (2011), http://digitalia.sbn.it/article/view/498.
[6] MIT license: http://opensource.org/licenses/MIT
[7] Mostre virtuali online cit., <http://www.otebac.it/getFile.php?id=502>.
[8] INDICATE Project http://www.indicate-project.org/getFile.php?id=359
[9] Fondazione Telecom Italia: http://www.fondazionetelecomitalia.it/bandi/bandi/beni-culturali-invisibili/43/progetti-finanziati
[10] Horizon 2010 Museum Edition (and 2013) http://www.nmc.org/pdf/2010-Horizon-Museum.pdf
[11] Horizon Report: http://www.nmc.org/pdf/2010-Horizon-Report.pdf
[12] Analysis of the consultation launched by the Green Paper on "Unlocking the potential of cultural and creative industries: http://ec.europa.eu/culture/our-policy-development/doc/analysis_green_paper.pdf
[13] C2010-183 http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:0183:FIN:IT:PDF
[14] LINKS to MOVIO published virtual exhibitions (derived from AthenaPlus activities)
    a. http://54.247.69.120/build/movio/unimorerobotica
[15] LINKS to MOVIO published virtual exhibitions:
    a. http://movio.beniculturali.it/bua/societasindacatopolitica/
    b. http://www.litaliachiamo.it/
    c. http://movio.beniculturali.it/mcrr/immaginidellagrandeguerra/

14 APPENDIX 2: DEFINITION OF TERMS AND ABBREVIATIONS

Term and abbreviation	Description
API	Application Programming Interface
DCH	Digital Cultural Heritage
DE	Digital Exhibition
DOM	Document Object Model
DoW	Description of Work (Technical Annex)
EDM	Europeana Data Model
GD Lib	Graphic library
GIS	Geographic information system
JSON	JavaScript Object Notation
LIBXML	Software library for parsing XML documents
LOD	Linked Open Data
MIT	Massachusetts Institute of Technology
PDO	PHP Data Objects
POI	Point Of Interest
PHPTAL	PHPTAL is a XML/XHTML template library for PHP
DBMS	Database Management System
SMCMS	Semantic Multimedia Content Management System
CMS	Content Management System
TAL	XML/XHTML template library for PHP
TP	Thematic Paths
WS	Web Service
WYSIWYG	"What You See Is What You Get". In computing, a WYSIWYG editor is a system in which content (text and graphics) displayed
XHTML	eXtensible HyperText Markup Language
XML	eXtensible Markup Language

Table 3: Terms and definitions used in this deliverable.

15 APPENDIX 3: CURRENT LIST OF INTERFACE TERMS OF THE MOVIO BACK-END

A list of terms of the MOVIO back-end (next table represents a small extraction) will be made available by month 13 to the AthenaPlus National Contact Points, to be translated in local languages. We will provide the list of terms through an on-line sheet and once completed, we will integrate the terms into the MOVIO multilingual platform enabling all partners to work using the back-end interface and their local languages.



The link to the on-line list of terms to be translated is:
https://docs.google.com/a/gruppometa.it/spreadsheet/ccc?key=0Ap8zJAd4wlwPdFh5V0prUUVrbjI3VFpFYzlPYVdHZHc&usp=sharing

Italian	English
Attenzione	Warning
Errore	Error
Nuova pagina	New page
Creazione nuova pagina	Create new page
Aggiunta nuova pagina	Insert new page
Titolo	Title
Attributo Title per link nella navigazione	Page title for navigation bar
Alt per link nella navigazione	Alt text for navigation bar
Selezionare la pagina	Select page
Selezionare la pagina padre	Select parent page
Selezionare il tipo della pagina	Select page type
Identificativo univoco della pagina	Page ID
URL collegato	Connected URL
Parole chiave	Keywords
Breve descrizione	Short description
Conferma	Confirm
Annulla	Cancel
Carica file	Upload
Reset form	Reset form
Visualizza pagina	Page view
Cerca	Search
Nuova ricerca	New search
Pubblicato premere per cambiare lo stato	Published click-on for change
Non pubblicato premere per cambiare lo stato	Unpublished click-on for change
Filtri di ricerca	Search filters

Table 4: A sample set of terms of the MOVIO Back-end, the list of terms is composed by more than 700 words.

16 APPENDIX 4: MOVIO handbooks

The following handbooks are provided as external annex to this deliverable (they are available in two languages: Italian and English).

The following documents are available at:



https://www.dropbox.com/sh/rgiwkecz9lcky3b/U4DN2x7jiW

01_MOVIO_tutorial_ontologybuilder_v00.95_REV
02_MOVIO_tutorial_mediarchive_v00.30_rev
03.2_MOVIO_tutorial_pagetype_alias_v00.20-c24.02_rev
03.3_MOVIO_tutorial_pagetype_cover_v00.20-c25.02_admin_REV
03.4_MOVIO_tutorial_pagetype_digitalexibition_v00.20-c25.02_REV
03.5_MOVIO_tutorial_pagetype_empty_v00.20-c25.02_rev
03.6_MOVIO_tutorial_pagetype_exibition_v00.20-26.02_REV
03.7_MOVIO_tutorial_pagetype_photogallery_v00.90-c01.03_REV
03.8_MOVIO_tutorial_pagetype_galleriafotograficafromcategory_v00.90-c26.02
03.9_MOVIO_tutorial_pagetype_googlemap_v00.90-c26.02_REV
03.10_MOVIO_tutorial_pagetype_homepage_v00.20-c_REV
03.11_MOVIO_tutorial_pagetype_imagehotspot_v00.20-c27.02_REV
03.12_MOVIO_tutorial_pagetype_login_v00.20-c26.02_REV
03.13_MOVIO_tutorial_pagetype_lostpassword_v00.20-c26.02_REV
03.14_MOVIO_tutorial_pagetype_page_v00.20-c26.02_REV
03.15_MOVIO_tutorial_pagetype_registrazione_v00.20-c26.02_REV
03.16_MOVIO_tutorial_pagetype_search_v00.20-c26.02_REV
03.17_MOVIO_tutorial_pagetype_sitemap_v00.20-c26.02_REV
03.18_MOVIO_tutorial_pagetype_storyteller_v00.20-c_REV
03.19_MOVIO_tutorial_pagetype_timeline_v00.90-c28.02_REV
03.20_MOVIO_tutorial_pagetype_userdetails_v00.20-c27.02_REV
03.21_MOVIO_tutorial_pagetype_video_v00.20-c27.02_REV
04_MOVIO_tutorial_backend_introduction_v00.20-c23.02_rev
06_MOVIO_tutorial_modulo_user_and_groups_v00.20-c23.02_REV
07_MOVIO_tutorial_multilingualism_v00.20-c23.10_REV
08_MOVIO_tutorial_template_v00.30-c01.03_REV
09_MOVIO_tutorial_WYSIWYG_v00.20-c_REV