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QVIZ

Query and context based visualization of time-spatial cultural dynamics

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Abstract

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Abstract Final Activity Report for the QVIZ project, co-funded by ICT Research Framework Programme of the European Union.

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QVIZ

Query and context based visualization of time-spatial cultural dynamics

Contract nr: 032518



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Executive summary

The Final Activity Report summarises the QVIZ project and emphasises the correlation between initial objectives and the final result – the integrated QVIZ platform. The platform currently provides access to 75,646 archival volumes, containing between 16 and 18 million digital images in two national archives through an innovative time-spatial and collaborative environment. The environment integrates a map and time based query interface for gaining access to archival resources with a collaborative environment which makes it possible for users to add and share references and to do collaborative knowledge building with other users. The use of an administrative ontology, which currently identifies 71,040 units linked by 216,289 relationships, and a time-spatial approach make

archival material significantly more accessible, and this approach enables cross-national and cross-institutional access to archival resources.

Through giving end users access to archival resources and combining the time-spatial environment with the collaborative environment, QVIZ has created an easy access search and knowledge building tool, which allows archival institutions to make their material more accessible, contextualised and collaborative on both a national and European level. Leading European archival institutions, projects and initiatives have shown an interest in the innovative concept and implementation of the QVIZ project.

The outline of the Final Activity Report is as follows: First a brief overview is given with information about the consortium and deliverables and milestones. Thereafter the objectives for the project are described and matched with the results (general and operational) from the project as well as with state of the art. The third part of the Final Activity Report provides an overview of the different work packages, describing the work carried out and how it relates to the objectives of each work package.

Brief orientation

Consortium:

The consortium consists of seven partners, each of them contributing significantly to the QVIZ-project through their specific competence and specialties. Through the character of the project, and the importance of intertwining skills, technologies and content, the project has a high degree of interdependency and shared responsibility. Hence WP leadership is distributed for a mutual engagement and commitment, as shown in the list below.

Partner	Area of expertise	Role in the project
Umeå	<ul style="list-style-type: none">• Experience in the merging of	<ul style="list-style-type: none">• Management and

University, Sweden (UMU)	humanities and technology and digital culture heritage <ul style="list-style-type: none"> • User centred design and adaptation of digital technology • System development and testing 	Coordinating partner <ul style="list-style-type: none"> • Dissemination and exploitation • Leader of WP 1 – Management
Salzburg Research Forschungs- gesellschaft, Austria (SRFG)	<ul style="list-style-type: none"> • Expertise in software architecture, designing and integrating of software components • Expertise in graphical modelling design tools for complex multi-media aware knowledge content models 	<ul style="list-style-type: none"> • Collaborative social software for knowledge building in ontologies and social knowledge content • Ontology schema design • Leader of WP 5 – Core component implementation
AS Regio Estonia (REGIO)	<ul style="list-style-type: none"> • Geographical information systems (GIS) and spatial content • Internet map servers and development of web mapping software 	<ul style="list-style-type: none"> • Development of time-spatial technological components. • Design and implementation of spatial interfaces using administrative ontology • Leader of WP 6 – Contextualisation and visualisation implementation
University of Portsmouth higher Education corporation, UK (UoP)	<ul style="list-style-type: none"> • Experience in complex spatial management • High level of skill in handling complex historical administrative units 	<ul style="list-style-type: none"> • Research in administrative units ontology • Design of administrative ontology and integration of technologies • Leader of WP 3 – Knowledge and analysis
Swedish National Archive, Sweden (SNA)	<ul style="list-style-type: none"> • Experienced portal builder • Expert in usage of archival and cultural heritage content 	<ul style="list-style-type: none"> • User scenarios and visualization and query support • Content provider • Leader for WP2 & 8– Requirements & Exploitation and dissemination

National Archive of Estonia, Estonia (NAE)	<ul style="list-style-type: none"> • Expert in usage of archival and cultural heritage content • Pedagogical experts 	<ul style="list-style-type: none"> • User scenarios and visualization and query support • Evaluation of prototypes • Content provider • Leader of WP 7 – Validation
Telefonica I+D, Spain (TID)	<ul style="list-style-type: none"> • E-services development • Personal Knowledge management and Intelligent Information Presentation • Content management and distribution 	<ul style="list-style-type: none"> • Focus on rights/licensing: from back end to front-end • Modelling for business/licensing and tasks relevant to the business models relevant to exploitation plans • Leader of WP 4 – Technical specification

List of deliverables

Del no	Title	WP/Task	Due date	Actual submission	Lead contractor
D2.1	State of the Art	WP2	M3	M5	SRFG
D3.1	Specification of Access Methodologies for Selected User Scenarios	WP3	M9	M9	NAE
D3.2	Administrative Ontology (Schema)	WP3	M22	M23	UoP
D3.3	Ontology for Domain (Schema)	WP3	M16	M20	SRFG
D3.4	Knowledge Content Model (KCO)	WP3	M18	M20	SRFG
D4.1	System Specification and Requirement Report	WP 2&4	M9	M9	TID/SNA

D.4.1.3	System Specification and Requirement Report Revision	WP2&4	M16	M18	TID/SNA
D.5.1	Toolkit Architecture Report Version 1	WP5	M12	M12	SRFG
D.5.2	Toolkit Architecture Report Version 2	WP5	M21	M24	UMU
D6.1	Integration Tools Social Software and Knowledge Content Model	WP6	M20	M24 (in D.5.2 and D.6.4.2b)	SRFG
D6.2	Tools for Dynamic and Query-Based Visualization Related to Concept in Time in Space and CH-Resources	WP6	M20	M24 (in D.5.2 and D.6.4.2b)	UMU/REGIO
D6.4.1	Prototype 1, Official Release During Interactive User Trials	WP6	M12	M12	UMU
D6.4.2a	Prototype 2a, Integrated Prototype Application for Communities and Archive Users	WP6	M16	M19	UMU
D6.4.2b	Prototype 2b, Final Release of Prototype, Based on User Trial Feedback	WP6	M21	M21-M24	UMU
D7.1.1	Software Validation Diary and Report Version 1	WP7	M11	M12	UMU
D7.1.2	Software Validation Online Diary and Final Validation Report	WP7	M15	M24	UMU

D7.3	Assessment Methodology and User Scenario Test Plan Final	WP7	M15	M19	NAE
D7.4	Evaluation Report of Case Study	WP7	M23	M24	NAE
D8.1.2	Exploitation Plan TIP and IPR-plan final	WP8	M22	M24	UMU
D8.2	Dissemination Plan	WP8	M3	M3	UMU

List of milestones

Milestone no.	Milestone name	Work package	Date due	Actual/Forecast delivery date	Lead contractor
	M9: System Specification and Requirements Report	WP4, WP2	M9	M9	TID/SNA
	M12: User Trials 1 Completed	WP7, (WP5/WP6)	M12	M12	NAE
	M16: 1st Phase Administrative Ontology Schema Specified and Implemented	WP3	M16	M16	UoP

	M16: Collaborative Archive Knowledge Content Objects and Rights Management Issues Specified	WP3	M16	M18	SRFG
	M23: User Trials 2, User Activities Completed	WP7	M23	M24	NAE
	M23: QVIZ Symposium	WP8	M23	M24	UMU

Introduction

Problems addressed in QVIZ

The quantities of digital archival resources are increasing rapidly due to better technologies to digitize and store archival material, and growing demand. There is also a political ambition to increase the amount of digital historical source material available in order to make cultural heritage more accessible. However, digitized archival resources do not automatically bring about accessibility, and there is a need to improve ways of finding and retrieving archival material. QVIZ provides a new and innovative means to access archival material. The overarching aim of QVIZ is to research and implement a time-map based search environment for archival information, and to build a collaborative environment for knowledge building within Communities of Practice (CoP).

A general foundation of the whole QVIZ project is to overcome the problem of changing administrative units (AU), such as dioceses, municipalities and parishes, over time. Since archival material is usually sorted and managed in relation to administrative belonging, archival material from the same geographical point is distributed on different archival institutions – which is a significant problem for accessibility. This complexity is mirrored in the systematization of archival holdings.

QVIZ results in summary

Currently QVIZ provides access to 75,646 archival volumes (files in ISDA(G)-terminology), containing between 16 and 18 million digital images in two national archives through a time-spatial and collaborative environment.

In terms of software results, QVIZ basically comprises two main sets of features and functionality, which have been developed and integrated in the project:

- A time-spatial environment – a map and time based query interface for gaining access to archival resources.
- A collaborative environment – which gives users the possibility to add and share references, for knowledge building together with other users.

The time-spatial environment can perform searches in the archives from simple clicks on the map or from a faceted browser. The faceted query uses different types of data associated with archival resources organized into logical groups. The data used is both the administrative context and user activities in the archival resources. As a natural part of the faceted query, a timeline also gives users the opportunity to find specific information for a particular point in time. Most importantly, the user is given a way to access the document through linkages to the archival portal that holds the content.

Knowledge building within communities of practice is an emerging practice not yet adopted by the archives, but very much needed by the users as a tool for knowledge building in a user to user environment. In QVIZ's collaborative environment, the users can create content themselves, but also work together with different communities of practice. The resources created by users are an essential part of the QVIZ system. They form an expansive knowledge base, built through a web of links used to compile the research results. Users can create groups of references to a specific topic, articles relating to their subject of interest, and summarize content of specific archival references. All of these can be made public or shared with other users.

Through giving end user access to archival resources and combining the time-spatial environment with the collaborative environment, QVIZ has created an easy access search and knowledge building tool, which allows archival institutions to make their material more accessible, contextualised and collaborative on a national and European level. Leading European archival institutions and projects have shown an interest in the innovative concept and implementation of the QVIZ project.

Progress toward general and specific objectives

The general objective of QVIZ is to:

Enhance access to Archival/Cultural Heritage resources by subscribers such as students, researchers, local historians and professional archival users. Rather than answering full text multilingual queries, multilingualism will be addressed at the knowledge level. Linking querying and visualization in a community knowledge building process will motivate European citizens to form communities that enhance access to and usage of archives.

The progress toward this general objective can be measured following the indicators in the Description of Work (p. 5):

- QVIZ has managed to involve two national archives using an integrated resource model based on ISDA(G) and the Administrative unit ontology. This approach enables cross-national access to archival resources.
- QVIZ has enabled wider usage of archival resources through the integration of a collaborative knowledge building process. This has also resulted in the potential to attract new users from established and emerging user groups.
- The QVIZ approach has not just simplified traditional access services, but also created a need for more advanced services within the archival sector.

Specific QVIZ objectives were:

- Motivate and enable community-based access to cultural heritage resources through query-based visualisation of time-spatial and knowledge dynamics.
- Motivate and enable community building through knowledge exchange and knowledge sharing using social technologies (Knowledge building).
- Identify different knowledge contexts for alternative communities of practice.

- Promote adaptation by cultural heritage institutions of a more community-centered, query/visualization based model of making complex resources accessible.
- Meet the needs of different user groups and communities of interest.
- Enable access via paid-systems in public, semi-public and restricted communities.

The progress toward these specific objectives can be measured following the indicators in the description of work (p. 6):

The QVIZ approach has attracted significant interest. Firstly, in and through the archival partners in the QVIZ project, namely SNA and NAE, but also more broadly and in relation to emerging projects such as EUROPEANA and EPA/APE-NET.

The results of QVIZ will be used by the National Archives of Estonia and Sweden. Discussions are going on with EUROPEANA. A final agreement, however, has yet to be reached.

QVIZ successfully blends archival information descriptions with time-spatial information in order to improve access.

The QVIZ platform enables different groups of users to cooperate with other users and communities, and also with content providers. This is done through the collaborative environment.

Progress toward operational objectives

The operational objectives (pp. 6–7 in Description of Work) can be divided into three different areas of challenge, each of them with a different focus. These are:

- To motivate **end users** through an interesting, engaging and usable platform, taking them further than any comparable tool currently can do.
- To promote and offer **content providers** a powerful platform for access to their resources.
- To research, innovate and develop **models and software** in order to meet end user requirement and content providers organisational and business requirement.

These three areas are highlighted in the following:

End users – operational objectives and results (objective 5)

Objective 5: To conduct end-user trials of the new environment

The needs of the end users are at the core of the QVIZ platform. In the second year, QVIZ focused even more on four specific target groups – students, educators, genealogists and professionals (who in the course of their work regularly use archival resources). Knowledge from experts and end users has been used to evaluate mock-ups, derive and define user scenarios, define and elaborate knowledge domain ontologies. End users have, in the later phase of the project, been consulted for the evaluation of the user interfaces.

The final test was conducted using a test scenario compiled through collaboration with historians and archive staff. Participants included representatives from the different user groups comprising people from three different universities with a variety in gender and age. This test led to two important conclusions. All users appreciated the general idea and that the enhanced accessibility of QVIZ contributed significantly to their user experience, and agreed on the innovative approach and enhanced accessibility QVIZ contributed to their user experience. The time-spatial interface in combination with the faceted browser was also regarded as very useful. Anyone with even a meagre knowledge of how to search archival material traditionally realized the benefits of a map and time-based search engine that gathers information from different archival institutions within the same portal. The collaborative environment was also appreciated, but was more difficult to understand

because its characteristics and concepts were more unfamiliar to the tested users. Working with advanced social software tools was a novelty to many users. Nevertheless, users were generally appreciative to the collaborative features of the system.

Content providers and market – operational objectives and results (objective 4 & 6)

Objective 4: To ensure the dissemination of the project results

The QVIZ logo and brand image were established early in the project and are accompanied by the QVIZ Web portal where all deliverables can be downloaded and other material is accessible.

The QVIZ partners have actively participated in relevant conferences, workshops and networks. QVIZ partners have participated and presented at EVA conferences, EDL-net, EUROPEANA, eChallenge, IST Africa, and more. The project has also been presented in different contexts in the US, Australia and Japan. QVIZ have produced project presentations in different media, leaflets, brochures or articles for potential user communities and have gained a good level of press coverage. Tutorial videos have been made to introduce the QVIZ system and provide initial knowledge about all functions.

As a final activity, we arranged an international symposium with approximately 10 invited speakers and participants from 11 countries in order to strengthen cooperation between communities of practice, cultural heritage institutions and technological developers. The seminars at the QVIZ symposium were archived and are retrievable through the QVIZ streaming application.

Objective 6: To design and evaluate sustainable business models and exploit the new knowledge created in the project

QVIZ has been developed for archival purposes, and this approach has produced a qualitatively different solution than traditional library approaches, although QVIZ can of course be combined with efforts in the digital library initiatives. The QVIZ consortium includes two national archival institutions (the National Archives of Estonia and Sweden), which have played a crucial role throughout the project. Additional institutions have been contacted for further collaboration (see attached dissemination plan). All Nordic and Baltic national archives have been contacted as well as the Hungarian National Archives, the Bundesarkiv in Germany, the Netherlands Nationaal Archief, the Regional and National Archives in Spain, and others.

The main target group for the exploitation are the content providers, but also national and European policy makers, researchers and developers that contribute to an enhanced accessibility in the cultural heritage sector and therefore ultimately the end users in the general public, all over and beyond Europe.

The most feasible business model for the integrated QVIZ platform is to have the content providers pay for their archives to be accessible through QVIZ. The content providers make up the target group that potentially could extract the most added value from the system by making the content of their archives more easily accessible to the public. The consortium has also looked into the possibility of using *Creative Commons* (CC) as an alternative business model that could possibly meet the needs for all partners. It provides a means to protect different parts of the system to different degrees i.e. some areas could be distributed as open content while still reserving the rights in other areas.

As has already been stated, the QVIZ approach has attracted significant interest within the archival partners within QVIZ project, the European archival community and in relation to emerging projects such as EUROPEANA and EPA/APE-NET. The results of QVIZ will be used within the National Archives of Estonia and Sweden. Discussions are going on with EUROPEANA, but a final agreement has not been reached.

QVIZ successfully blends archival information descriptions with time-spatial information in order to improve access. The QVIZ platform enables different groups of users to cooperate with other users and communities, and also with content providers. This is done through the collaborative environment.

Apart from the integrated platform there are a number of separate exploitable results:

Dynamic user interfaces for discovery of archival resources – an interface service that is a part of the integrated platform. However, the browsing mechanism using time-spatial and contextual attributes could be used as a tool to create other types of retrieval systems.

Social bookmarking of archival resources within archival portals – an interface where users can store their references to archival resources. It is also an application that is able to connect to different services internal and external to the QVIZ system.

Environment for social knowledge building based on archival resources – The aim of the Collaborative Environment Tools is to enhance access to archival resources by providing the means to interrelate them in new contexts and discover resources in new or different contexts than presently available in the archival portals.

European administrative ontology – The ontology combines an archival tradition which treats the administrative units primarily as corporate bodies, and a Geographical Information Systems approach which treats them primarily as geometric shapes.

Domain ontology – The QVIZ-domain model aims to support the user creation of content in the QVIZ-system and the building of semantic networks interrelating references to archive resources.

Time-spatial indexes of archival resources – The archival content which is explorable in QVIZ. The content provider must build such an index step by step. It is designed to have a limited set of information in order not to store data redundantly.

All these technologies – developed within the QVIZ project – are exploitable results.

Models and software advancement – operational objectives and results (objective 0, 1, 2 & 3)

The QVIZ platform is composed of mainly two basic sets of integrated functionalities – the Query Visualization environment and the Collaborative Environment, where the middleware components make up the integrative and communicative matrix.

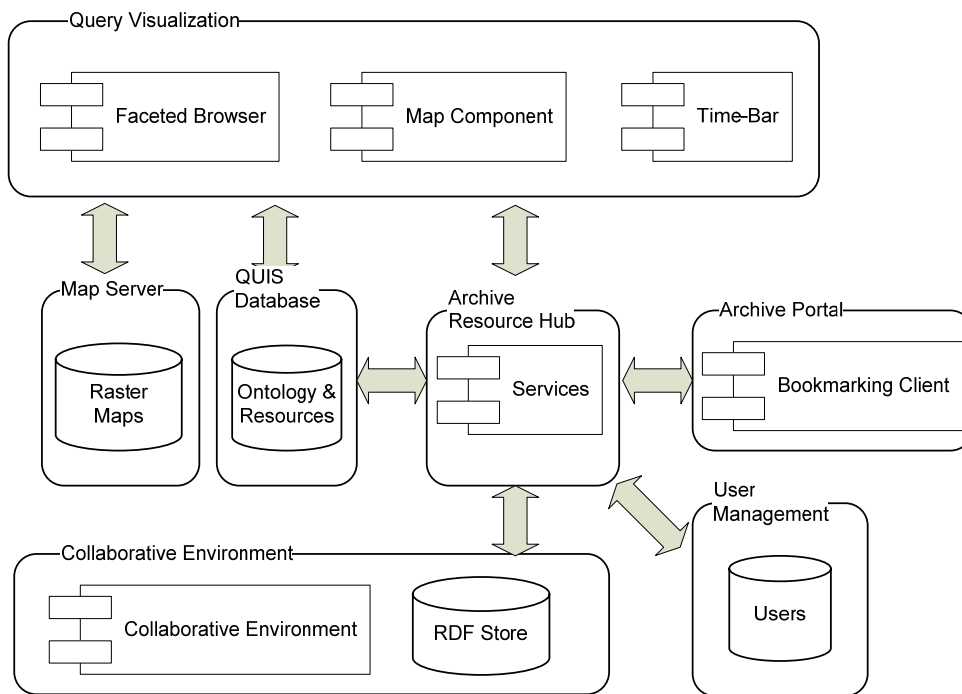


Figure 1. General architecture of QVIZ.

Below are the specific objectives as stated in the original contract, related to the technical infrastructure.

Objective 0: To design an ontology of European Administrative Units defining temporal and spatial relationships and so support dynamic map-based visualization

In the QVIZ system the Administrative Unit Ontology (AUO) acts as a core component through providing a framework through which the diverse sources of data can be displayed together in a single visualization interface. An administrative unit is, for the purposes of this project, a public sector corporate body with an area of operation defined by law. The vast majority of administrative units can be grouped into unit types, such as forms of parish or district. These forms in turn are themselves defined by law and concern the governance of people. Church districts in Sweden are one example of this. These units often had responsibility for keeping track of births, deaths, migration, holy communions, etc. However these administrative units could change their name, geographical area and their relationships to other units over time. These dynamic changes reflect alterations to the structure of governance.

The QVIZ interface provides a unique portal to access similar kinds of digital archival resources from disparate national archives. As European cultural heritage institutions gather ever increasing amounts of digital content, the QVIZ user interface offers an opportunity to facilitate access to that content in a single user environment. It incorporates the administrative history of all the detailed units involved, a faceted browser and a mapping interface with the additional benefit of support and discussion between users of the same content through Communities of Practice.

Objective 3: To create innovative query/visualization capabilities

Visualizing information is a central task in this project. With a faceted query system one can narrow down search results by selecting different facets. The result of this search is visualized on a map and in a result list. This environment is used for searching and visualizing information.

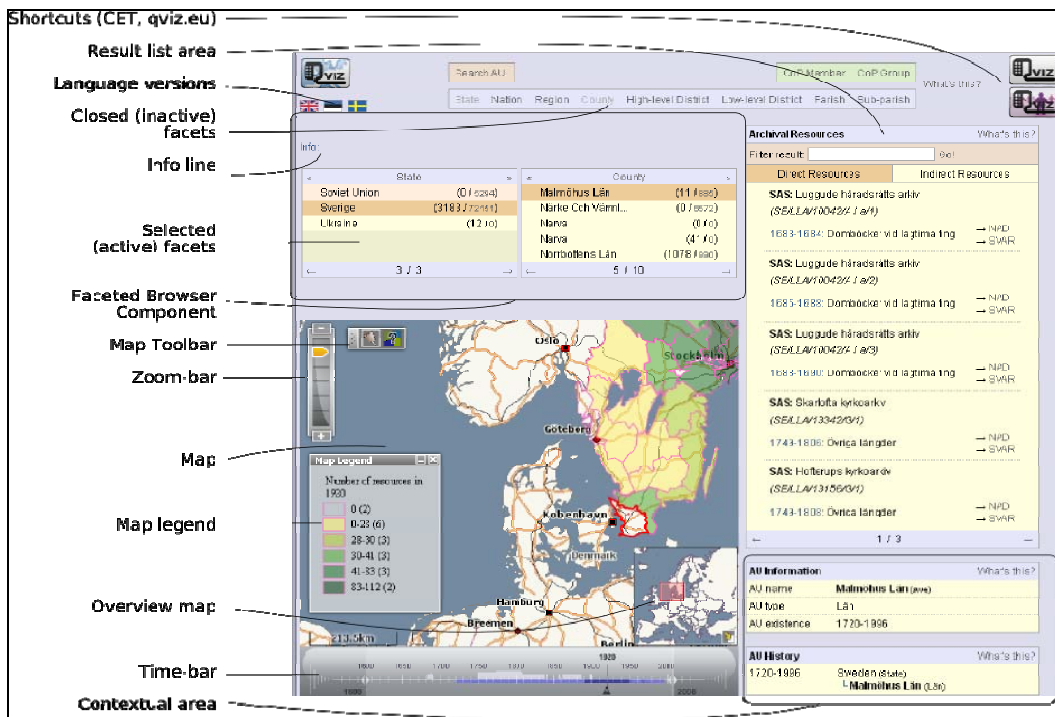


Figure 2. Layout of the Query Visualization Environment.

The interface is divided into two parts – the Time Spatial Client and the Faceted Query Browser. The Time Spatial Client consists of the map and the time-bar. The Faceted Query Browser consists of the Faceted Query Component, a Language Selector, the Result List, and the Contextual Area. They are integrated through a JavaScript controller.

The Map component can handle both raster and vector graphics. Raster images in the background are normally used as a base map while the vector graphics in the foreground presents the thematic information such as points of interests etc. Raster data handling is based on raster-tiling technology.

In addition there is also a time bar which allows the user to select a special period of interest and change the time of the map. The period of interest helps the user to filter the values in the faceted browser and in the different result lists.

A Time Spatial Middleware has also been developed to provide an interconnection with the different spatial databases. The middleware handles the generalisation of datasets. This is done in order to optimize the responsiveness of user interfaces. The middleware also generates dynamic representations of particular temporal intervals, even when spatial data such as polygons are missing. This is done by using information of relationships between administrative units on different levels in the hierarchy.

Objective 1: *To create contextualization and knowledge building software for use by Communities of Practice (CoP)*

The aim is to create new knowledge and content in communities and associate knowledge from Communities of Practice with archival resources referenced in archive portals as well as new content in the collaborative environment. The users enhance the comprehension and access to both new content and archival content from semantic annotations, metadata descriptions and new content.

Therefore a *domain ontology* has been developed. A domain ontology is a computational representation of the most relevant *things* of a specific branch of reality. In order to be understandable to computers this consists of a *vocabulary* together with its formal *semantics* (its background knowledge) which expresses the intended meaning of the concepts.

The QVIZ domain ontology is reflected in the computational objects designed and developed for the QVIZ software prototype, with its origin in user scenarios. These computational objects use a very novel content model called *KCO - Knowledge Content Object*. This is a highly structured, yet general data model for knowledge based content. This model is refined and specialized by the QVIZ domain ontology, thus creating a bridge between QVIZ objects and the world of all knowledge-annotated content in the Semantic Web.

Based on a domain ontology, the users in communities could, for example, create collaborative resources, associate new knowledge to archive resources or resources of other users, or combine singular items of information into aggregated information structures. Consequently by combining the added-value content with so-called semantic models (ontologies), the content created by a community becomes, to some extent, understandable and interpretable by machines. Thus it is amenable to semantic search as foreseen by the Semantic Web Initiative.

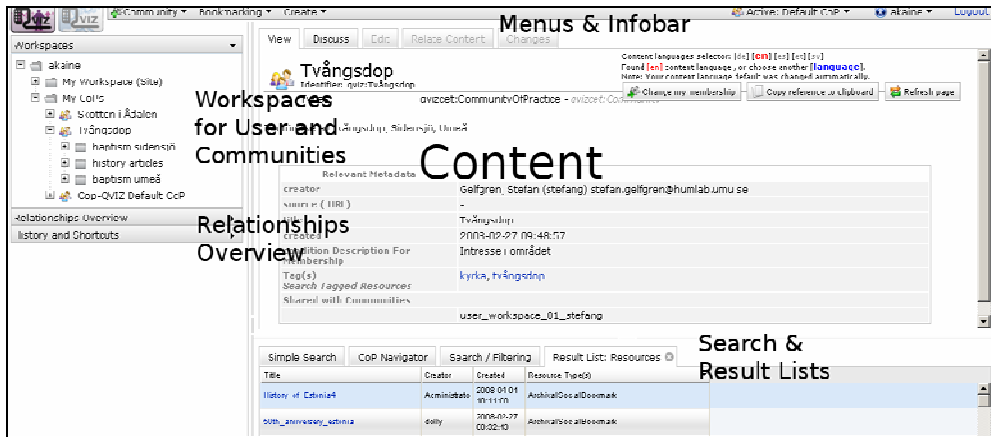


Figure 3. Basic Layout.

The goal has been to build connections between resources using named relations from the ontology, which then can be visualized and browsed using the Relationships Overview portlet¹ - a knowledge-content visualization generated by SPARQL² content templates which are triggered by the direct and inferred ontology classes and relationships of the resource.

The Collaborative Environment is deployed as a Java web application. It is, however, heavily supported by AJAX technologies based on the Dojo³ toolkit and JSON⁴.

¹ <http://en.wikipedia.org/wiki/Portlet>

² <http://www.w3.org/TR/rdf-sparql-query/>

³ <http://dojotoolkit.org/>

⁴ <http://www.json.org/>

Users can login, perform basic text searching and advanced ontology-supported search, create typed content, manage semantic annotations and metadata and visualize relationships between resources based on ontology properties via automated SPARQL queries triggered by direct and inherited resource types.

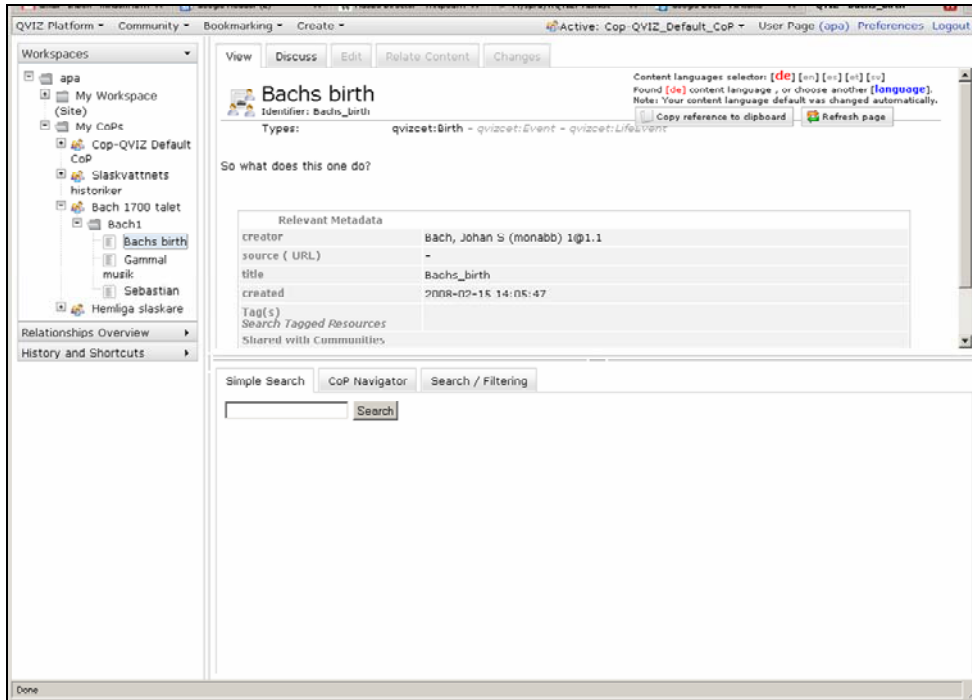


Figure 4. Basic layout with workspaces example.

The workspace portlet provides the user with features to manage references to resources either in their own workspace or with community workspaces. The workspaces help to organize resources, to facilitate further sharing, to further categorize resources, or even for searching. The workspace is also part of the ontology as it enhances search and visualization processes.

The relationships overview portlet provides the important feature for visualizing knowledge content. Additional details are provided in the knowledge content section. Relationships can be assigned between resources using the Relate feature or by inserting the reference directly in the content. Authors can also share their collaborative documents resources with one or more communities providing members with basic view or edit privileges for the textual content; to enhance knowledge and archival resource access, the

semantic descriptions and visualization are always visible by all QVIZ users. Many resources created are sharable by all users, and these types of resources facilitate knowledge building and will be discussed in subsequent sections.

Objective 2: To apply state-of-the-art knowledge management technologies to the QVIZ archival knowledge infrastructure

QVIZ proposes a novel format for knowledge exchange between information systems that is based and inspired by a model for *intelligent content*, which was pioneered in the METOKIS1 project (2004 - 2005). A KCO is a structure that contains those descriptions about content objects that are essential for communicating and trading digital content. It is a machine-readable thematic classification and context description that can contain a usage history and planned usage for a target community, license and contract information as well as a presentation description that turns digital content from a simple file into added value for use within information systems.

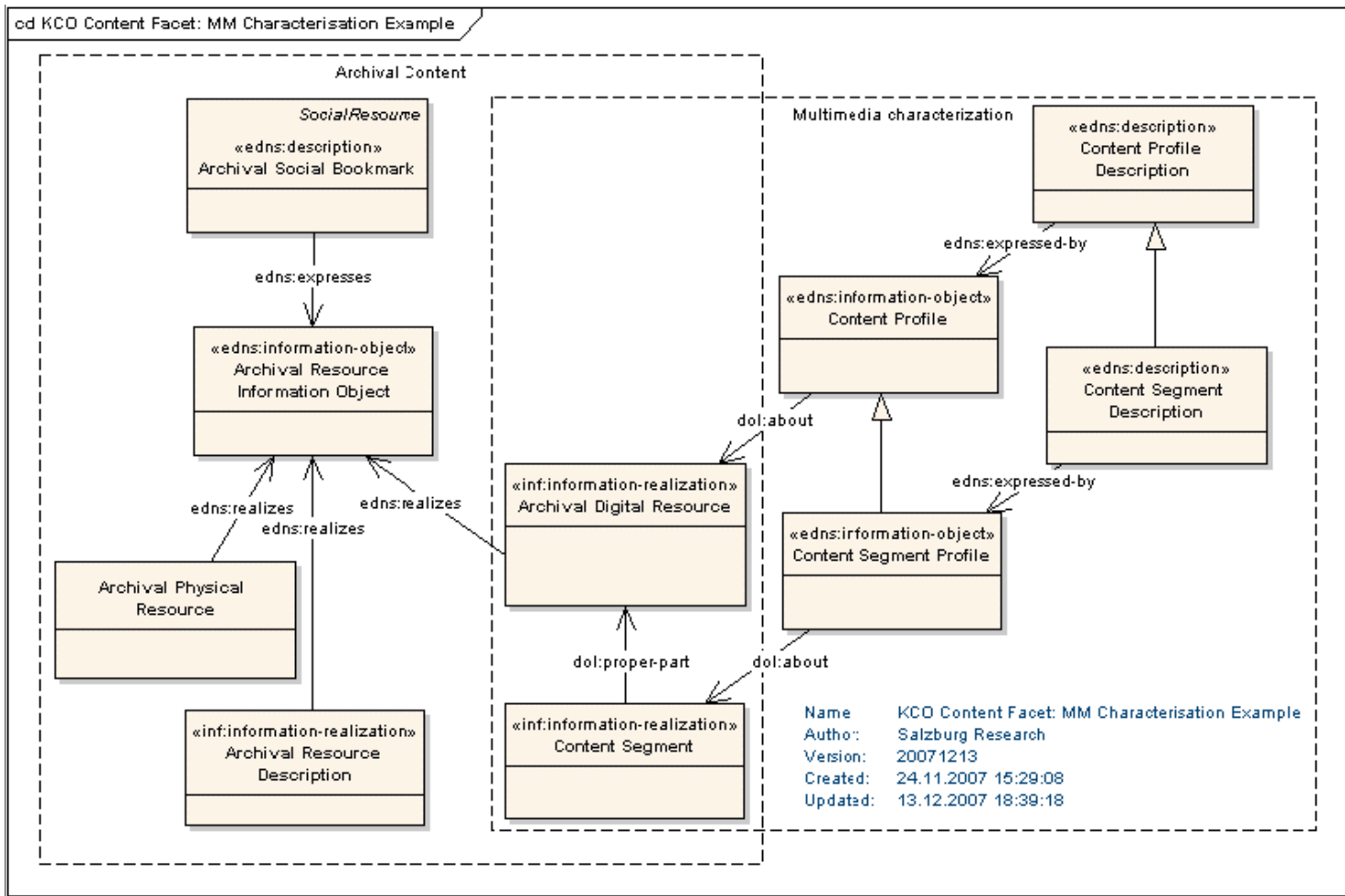


Figure 5. KCO Content description facet.

An Archival Digital Resource is described by a Content Profile, and a segment of the Archival Digital Resource is described by a Content Segment Profile.

QVIZ results and State of the Art

State of the Art Summary

The initial challenges addressed are the following:

- Presentation of archival information is so complex and disparate that easy access is restricted.
- End user knowledge is often neglected

QVIZ provide solutions to the identified challenges by:

- Visualizing and querying archival resources by a time-space interface based on maps and emergent knowledge structures.
- Integrating social software in order to utilize knowledge in existing and new communities of practice.

During the whole project, State of the Art analysis has been taken into consideration in the different work packages: *technologies for archival organisation, social software, gazetteers technologies, GIS technologies, visualization, community and knowledge repositories.*

Additionally, QVIZ has followed standards where available and tried to understand how the developments it has had to make may fit into future standards.

For each theme we list a number of key points that are relevant to future work in the project as well as to an understanding of the state of the art in these areas, described in detail below:

- Archive and content organization

- Technologies relevant to QVIZ
- Models and standards for handling content and knowledge (ontologies, thesauri etc)

Archive and content organization

Within this theme, the structure of administrative units at partner sites was initially specified at a high level. Analyses of organisational schemes for archival documents provided an important foundation, as well as an overview of existing standards for describing archival resources and discussion of requirements for semantically enhanced resources.

Another important focus within this theme was the description of different approaches to visualizing and modelling administrative unit data. This work included researching various methodologies for providing highly functional interfaces for users with limited knowledge about archival structures.

Examples of important topics covered:

- Understanding of approaches to handle the complexity of Administrative Units, such as ADL (Alexandria Digital Library) Gazetteers and ADL feature type thesaurus, EDL, EUROPEANA.
- Communication of models and structures of existing systems, primarily the Vision of Britain Gazetteer approach for administrative units.
- Existing GIS-approaches help to capture important user and functional requirements, such an existing system at national archive of Estonia, and also pioneering examples from leading GIS developers.
- Partners also communicated other prototypes with non-conventional approaches for access to time-spatial administrative units, using and evaluating “time-less

access to time-spatial resources”, which help capturing user requirements and also functional requirements for European administrative ontology.

- Internal archive’ organisation has been explored to model domain ontology.
- Archival standards such as ISAD(G) (General International Standard Archival Description)

In general, the state of the art has contributed to discovering the access strategies involving social book marking, semantic descriptions, archive descriptions and archive material registration data. Description of data structures of existing data and alternative approaches for more query-flexible approaches, in order to use QVIZ system by other archives or services.

Technologies relevant to QVIZ

This describes the technical baselines on which the project has based its implementation. There are many different digital tools for social collaborative processes and for QVIZ it is necessary to be aware of these and evaluate their potential. Furthermore, QVIZ needs technologies for handling different types of archival and community related repositories. Other important technologies involve tools for handling dynamic and rich user interfaces, including map and complex query mechanisms, using ontologies of European administrative units, archival organisation as well as community added semantic description.

Social software

Primarily, as the project was involved in the development of social software, the partners collaborated and used social software for their work, creating QVIZ knowledge and also integrating this wiki-based collaboration within the QVIZ- collaborative tools:

- Different kinds of social software have been evaluated including blogs, wikis social bookmarking and web 2.0 applications (such as Google Earth time series function) and have been documented.
- Knowledge about different kinds of aggregation, subscription and information technologies are important to QVIZ. This includes news feed style (RSS aggregation) subscription or advertisement of QVIZ resources and CoP activities. A news channel could be simply a “query” into QVIZ for certain resources, subjects, topics, saved map /knowledge queries, etc.
- Agent frameworks have been investigated and one platform looked at is the Jadex framework. One key question addressed here whether agents can be used to better support communities.
- Create content using a basic WYSIWYG editor and wiki-style open linking.

Archival content and social semantics repositories

- We worked with both Jena and Sesame version 2 based repositories. The Jena model created is based on both RDFS and OWL.

The state of art within this theme has contributed to investigate access strategies involving social bookmarking, semantic descriptions, archive descriptions and archive material registration data.

Query and visualisation tools

- Facetted search and dynamic advanced query combinations can and should be adopted (subject, title, topic, admin units, other relation facets). However the quality of content decides what will be of real use.
- Web 2.0 technologies were further investigated including advanced client and visualisation support using AJAX and FLASH based GIS tools.

- The map component uses its own XML format, but currently also supports OGC EWKT (Extended Well Known Text).

The State of Art has contributed to give an overview of WebGIS functionalities, visualization issues and problems as well as a technological framework and service standards of modern web mapping.

Models and standards for handling content and knowledge

QVIZ has the overall objective to enhance end-user access to digital archival resources. The project increases the access by using knowledge from its user as well as the administrative context of the documents in time and space. The major objectives have been to:

- Design the ontology of European Administrative units, defining temporal and spatial relationship
- Design innovative query and visualization capabilities to explore administrative context and discover digital archival resources.
- Support user communities knowledge building

The QVIZ-project has therefore used this close connection of knowledge about administrative unit history and the creation of archival collections in order to create a more user friendly search process This knowledge is based on the General International Standard Archival Description (ISAD(G)).

The domain ontology includes a number of existing ontologies, including base ontologies, to support portal features, community processes (such as DOLCE and SKOS), and mapping between certain ontologies. There is an emphasis on the social activities that benefit from Argumentation, SIOC, Trust. Using FOAF (friend of a friend) we

describe and relate persons, and tie in to SIOC. The FOAF document and FOAF Agent are used as either subclass or super class and help unite different ontologies.

The first objective focuses on creating a stable reference data model that records complex relations in time and space and the dependencies between administrative units at different geographical levels over time. As such the model enables users to access archival resources by place name or location without the need of complete knowledge of its administrative history.

The second objective is aimed at creating a rich environment to explore the administrative unit context by defining rules and models for dynamic representation even when spatial data such as polygons are missing. This environment is also aimed at providing a simple way to discover archival resources for users that are not familiar with archival resources.

Knowledge building within communities of practice is an emerging practice not yet adopted by the archives, but very much needed by the users as a tool for knowledge building in a user to user environment. In QVIZ's collaborative environment, the users can create content themselves, but also work together with different communities of practice. The resources created by users are an essential part of the QVIZ system. They form an expansive knowledge base, built through a knowledge ontologies of links used to compile the research results. Users can create groups of references to a specific topic, articles relating to their subject of interest, and summarize content of specific archival references. All of these can be made public or shared with other users.

Work package overview – key achievements

Work package relations – an introduction

Starting from a mutual vision, the different work packages are closely related to each other and each partner plays a significant complementary role in the consortium. All partners have WP leadership, and all partners contribute to all work packages. At the same time all partners are specialised and experts within their fields and have a special interest in their own area of expertise. This is, of course, also related to the exploitation plan and each partner's aim to get a return on investments.

The M 12 review pointed out some problems with integration, when it came to technologies developed and how they fitted into the QVIZ platform. This can be explained through the explorative character of the project – each technology had to be explored and tested on its own before the different parts could be incorporated into one seamless, yet modular component. Modularity is important not least to maximize exploitation possibilities and to provide an adaptable system.

However, during the second half of the project, a number of integrative actions have been taken, and a major effort has been put into a higher degree of integration of technologies and partner expertise. These efforts are described in more detail in WP 1 – Management – and in the other work package descriptions (and associated deliverables).

The QVIZ platform is the first of its kind to involve archives in different countries in an integrated system, and it gives the user access to international archives from one entry point based on a time-spatial and collaborative interface. The QVIZ platform has thus integrated the faceted browser, the time-spatial search functionality, the bookmarking feature, and the collaborative environment into one platform.

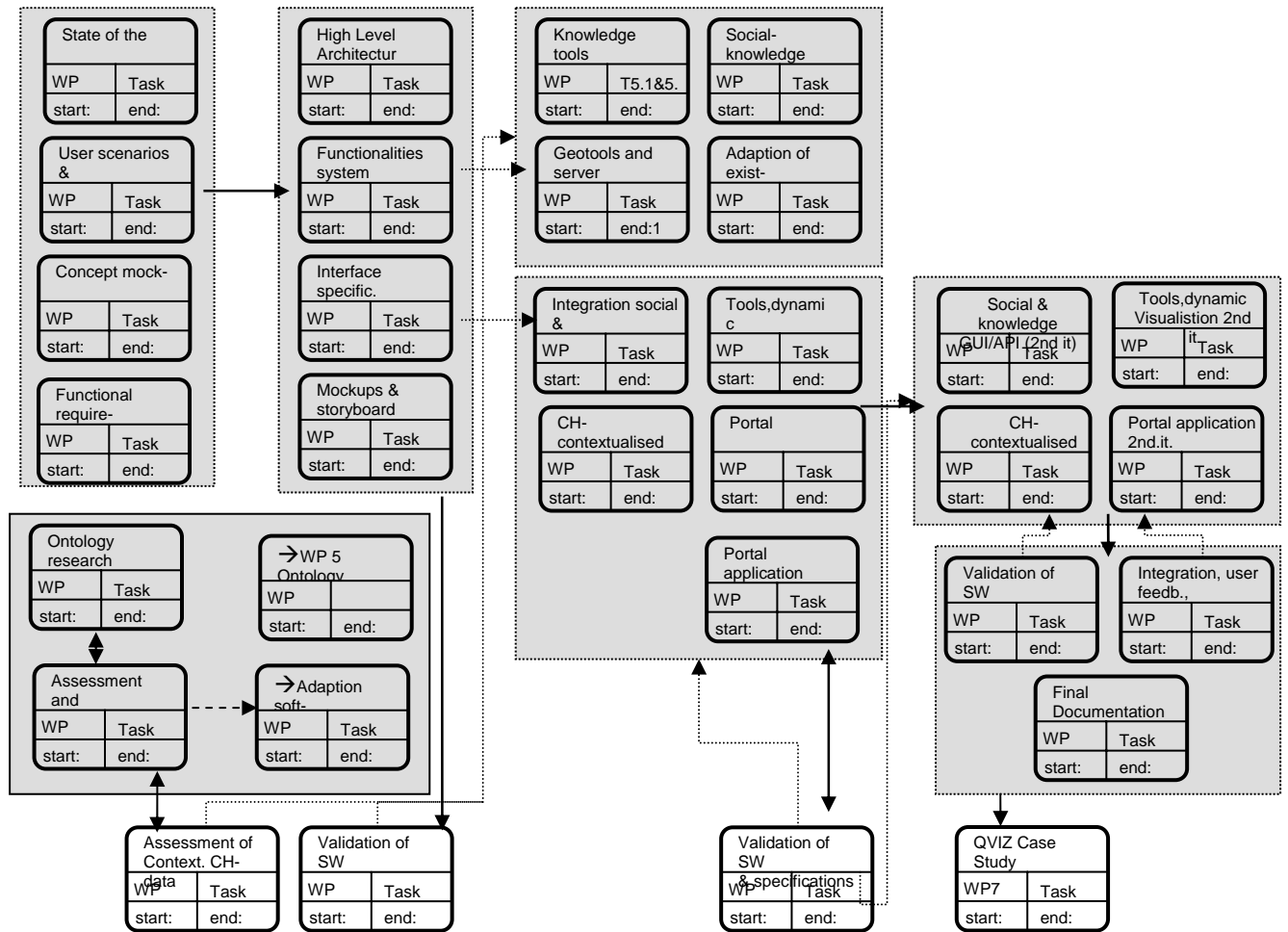


Figure 7. Work packages and their relations.

Work package 1 – Management

WP leader: Fredrik Palm, UMU

Introduction

WP 1 has a threefold aim: First, to define project management procedures and set up a management structure. Secondly, this work package implements the project management system. The third aim is to perform project management throughout the duration of the project.

Objectives

The objectives of this work package have been to:

- Put in place a structure for the effective and efficient management of the project towards its objectives.
- Conduct management and adapt to any problems that might occur.

Activities in Work Package

Management has been reported continuously throughout the project, and has resulted in:

- Intermediate Management and Activity report at M6
- Management and activity reports of 1st year at M12
- Final Management and activity reports – at the closure of the project.

After the review and an internal evaluation over the first 12 months of the project, it was clear that most of the management procedure work was sufficient, however some adjustments were made. The regular PMT-meetings were complemented by better documentation which improved the process and increased efficiency. The second year of the project required more integration of the various activities. Therefore the management team at UMU had to more tightly coordinate the different activities in the work packages. For example, an experienced IT architect was involved to help coordinate the prioritization of technical development activities. To increase the quality of the research result and public use of the research deliverable, a more formalized quality control process was implemented. UMU also involved experienced software validation competence to further improve the quality control of the technical results. This more coordinator-centric approach was needed because of the interdependencies of the results from different work packages and because of the emphasis put on integration of QVIZ components.

Results

Project Management Team meetings (chaired by the WP 1 leader) were held approximately every other week, and here the work process and internal reporting were important recurring points. The PMT meetings were complemented with reporting tools and use of the QVIZ Wiki. In addition, there was daily contact between partners through various channels of communication.

Since the project start, eight consortium meetings have been organized. Steering Group Meetings were normally carried out in conjunction or just before these consortium meetings (May 2006 and October 2006). Two Steering Group meetings (March 2007 and December 2007) were facilitated through video conference technology.

A Wiki-tool has been used for internal communication, although by M13 it was complemented by a more formal reporting tool, i.e. Projectcoordinator.

The QVIZ wiki made up an important part the management and project structure. The wiki is a dynamic electronic resource of considerable size where much of the distributed project work developed on a daily basis. Gradually practices for using the wiki were established, and while there was still a great degree of individual freedom, a set of working conventions developed. Due to the fact that a wiki affords limited opportunities for complex discussion, a forum was suggested as an additional electronic resource. The QVIZ forum was set up shortly after the second consortium meeting, and this resource proved to be useful, but in the long run, it was not used extensively (possibly because of overlap with other communication resources).

As a consequence of the more integrated work during the second year, more physical meetings were needed. Apart from the majors consortium meetings, several meetings have been held to coordinate technical integration work. These meeting were organized within WP 3, WP4, WP5 and WP6 (July, September and November 2007).

There has been one steering meeting after the M12 review. That meeting was held in December 2007. The main outcome of the meeting was the agreement to ensure the governances of the available prototype for demonstration purposes.

In order to improve management the final year PMT-meeting notes are published on the wiki as a method of simplifying management. Newsletters and summaries are sent to project officers.

Periodical and final reports have been written and submitted.

Work package 2 – Requirements

WP leader: Peder Andréén, SNA

Introduction

The WP2 main objective is to meet the need for translation of the general requirements to the technical specifications. This work package has served as the necessary input to the subsequent work packages. WP 2 examined requirements for the QVIZ platform based upon how users would like the system to work. It defined user groups, and developed and designed user scenarios, conceptual storyboards and mock-ups.

The work is partly related to dissemination and exploitation activities as well, building social knowledge reference networks within and outside cultural heritage communities.

The second part of WP2 was closely dependent on WP4 *System Specification* and the results in WP2 were also jointly published in the deliverable D4.1.3. *System specification and requirements report*.

WP2 was also related to WP3 *Knowledge and Analysis* but to a lesser extent in the later part of the WP time span.

WP2 was closely related to WP8 *Exploitation and Dissemination* where the WP2 results were elaborated and put into action.

Objectives

The purpose of this work package has been to:

- Produce a State of the Art report to guide knowledge and implementation work packages
- Identify user requirements
- Identify business and community requirements to support business processes
- Derive the functional requirements so it meets user requirements

Activities in Work Package

This WP was divided into four different tasks:

- State of the Art analysis
- User Scenarios and requirements
- Concept Mock-ups
- Deriving functional requirements from user requirements

WP2 was a collaborative effort involving the whole QVIZ Consortium. Since WP2 was where the actual foundation of the project were established it was also this WP that created an environment for the collaborative learning processes that have enhanced the understanding among the partners and their respective institutions about the intersection of cultural heritage, user interfaces and technology.

The requirements were basically formed in the first phase of the WP, but the second revision was an indispensable part of the concretisation and realisation of the QVIZ system tools. The revised requirements provided the necessary reality check for the technical development process.

Since the work was partly related to dissemination and exploitation activities as well, WP 2 contributed to WP 8 through building social knowledge reference network within and outside cultural heritage communities. WP2 also contributed to exploitation due to the revision of business requirements.

WP 2 achievements also contributed to WP 8 through the establishment of social knowledge reference networks within and outside cultural heritage communities and through the revision of business requirements.

Results

The overall achievement has been to define requirements for the QVIZ platform, and translate them into a technical specification. In that way WP 2 laid the foundation for the whole project.

In the second part of WP2 the following results were published in the D4.1.3. system specification, and the requirements report were delivered in M16:

- QVIZ Integrated Scenario
- Use Cases and Functional Requirements
- Business Requirements of QVIZ Target Groups
- Necessary requirements to exploit the commercial final product of the QVIZ project
- Requirement and Business Model for the post project administration and development of the QVIZ System

- Information Storage Requirements
- Non-functional Requirements

Work package 3 – Knowledge and Analysis

WP leader: Humphrey Southall, UoP

Introduction

This work package focused on the organization of knowledge required to support the QVIZ interface. Although this included work to define a “domain ontology”, essentially a classification of archival documents, the main focus was the ontology of administrative units, as an encapsulation of geography. This ontology necessarily has many of the capabilities of a gazetteer and of a GIS, but the central structure is semantic not spatial.

The main priority for the Domain ontology was to describe relevant archive materials and the access strategies. The association of administrative units to digital content did prove achievable for the selected content despite having different partner archive information systems. From the results of D3.1 describing access strategies and an initial internal specification for archival social bookmarking, the specifications and implementation workpackages (WP4 and WP5) synergized to evolve the concrete access solutions used by the QVIZ components.

Objectives

The objectives for this Work package are as follows:

- Define the scope of the ontologies
- Identify the sources and access strategies for the archival content and administrative unit data
- Define the type and scope of the archival content, and the types of resources

- Agree upon gazetteers, support thesauri, and supporting material for topic classifications
- Derive the requirements for the administrative ontology
- Derive requirements for domain ontology(s)
- Derive requirements for community and visualisation ontologies

Activities in Work Package

This WP has been divided into four different tasks:

- Selection and accessibility of archival content
- Ontology for administrative unit, visualisation and user queries
- Domain ontology developments, visualisation and query support
- Domain ontology developments, visualisation and query support

This package would have been quite impractical within the available resources if the administrative unit ontology (AUO) had had to be constructed from scratch. Fortunately, we were able to draw on very extensive existing resources. Firstly, our data model was derived from that developed by the Great Britain Historical GIS project for its Vision of Britain web site, which was in turn influenced both by the Alexandria Digital Library's gazetteer work and by the Swedish National Archive's National Archival Database. Secondly, most of the AUO content came from the existing British and Swedish systems, plus more fragmentary material from the Estonian archives.

Even so, the new work was extensive, involving developing new relationships between project partners, and in particular between archivists and technologists. The existing data model had to be modified to handle multiple languages, and the database context revised to allow for diverse character sets and a system of geographical coordinates able to handle the whole of Europe. Much work was needed to formalise the system by adding constraints, for example adding a trigger function requiring all relationships between

units to follow rules about which kinds of relationships could exist between given combinations of unit types. We could not specify that all information must come from an identifiable “authority”; we had to gather such authority data so that it was true.

Although the existing data sets all broadly fitted our data model, a significant amount of work was needed to integrate them. In the case of the Swedish data, it had been created some years earlier and some work had to be done to identify the most complete version. We also made a start on gathering information about the rest of Europe, on national boundaries and international organisations. This did require some new work with primary sources.

Results

The main results, published in D3.2.–3.4, of this WP during the second phase include:

- A data model has been implemented which formalises administrative unit gazetteers as a true ontology, enumerating entities rather than terms, enabling each unit to have many names in many languages, and relating units via a differentiated set of relationships (although “IsPartOf” is the most common). This data model optionally includes polygons representing administrative boundaries. This means that where the necessary data are available, the system has the capabilities of a GIS (Geographical Information System), but it can be implemented based on far more limited data. Particular work during the second phase involved adding two additional concepts, *Jurisdictions* enabling us to identify which organisation, such as a national archive, controlled a given unit type, while *Functions* enabled us to group administrative units by purpose.
- By the end of the first phase we had a small prototype limited to Estonia, but we now have a data structure identifying 71,030 units linked by 216,289 relationships. As well as very extensive listings of the administrative units of Britain, Estonia and Sweden, the system includes all the states of Europe since the Congress of Vienna (1815), plus systematic information on their boundary changes; the main limitation is that we have not attempted to include periods of

conflict, or contested boundaries. We have also included the relationships between the states and various international organisation, including the European Union itself. We have therefore created very extensive foundations for a system covering the whole of Europe, and the system is ready, for example, to include names in the Greek or Cyrillic alphabets.

- Building a true distributed system, enabling each archive to maintain its own administrative unit ontology but then share it with all partners, was beyond the scope of the project. However, we have developed a specification so that further data could be added to the system in bulk, for example covering the whole administrative geography of a new country. We are also completing an editing system enabling detailed changes to be made, via a web interface; for example, adding a single unit or a new variant name.

Work package 4 – Technical specification

WP leader: Sara Carro, TID

Introduction

The purpose of this work package is to describe the system specifications. All tasks contributed to a final deliverable D4.1 that describes architecture, functionalities of system components, interface specification among components, and user interface mock-ups & story boards. This work package was followed by a validation cycle to get feedback on user interfaces and resolve misunderstandings and optimize development.

Technical specification depends deeply on the WP2 Requirements analysis and to some extent on the WP3 Access Strategies Specification. The use cases developed provided an outline of how the main QVIZ components should interact among one another and with users.

These user cases, presented in D4.1.2 System Specification and Requirement Report (1st Phase) and D4.1.3 System Specification and Requirement Report (2nd Phase), laid the foundation for core component implementation, and contextualization and visualization within WP5 and WP6, and also informed the second iteration. Finally, the WP4 results were validated by evaluating the correspondence from the system compliance to the specification in WP7.

Objectives

The concrete objectives for this Work package are as follows:

- Identify and define functional and non functional technical requirements of system.
- Design the high level architecture and its system components to produce system technical specification.
- Specify interactions among system components and its interfaces.
- Produce models for prototyping the QVIZ user interface.

Activities in Work Package

This WP was divided into four different tasks:

- High-level architecture
- Functionalities of system components
- Interface specifications among components
- User interface mockups and storyboards

In this WP all partners have been involve in their respective fields of expertise. Partners with an expertise in the archival sector (SNA, NAE, TID and UMU) worked with archive interface interactions. Technology Knowledge Partners (SRFG and UoP) have worked

with collaborative environments and knowledge and contextualization fields (such as administrative units) based on ontologies. Geospatial visualization partners (UMU and Regio) worked with time spatial map interfaces and faceted queries. Other partners such as (UMU, SNA and TID) have worked with management, publication and rights issues.

The activities in the second phase of the project have been focused on continuing the update of the aforementioned tasks of WP4 based on the further refinement of the user cases development, functionalities of system components and the consortium-wide prioritization.

Results

Overall, the main achievements have been to improve and finalise the technical specification from the results obtained in first phase by means of an iterative process.

The main results of this WP, Technical specification, during the second phase include:

- D 4.1.3, *System specification and requirements report* – it formalises WP2 and WP4 results and gathers feedback from implementation and validation WPs. Detailed specification of the domains and their relations serve as the basis for the development of the technical framework. These domains included are Query and Visualization domain, Collaborative Domain, and QVIZ Archive Hub Domain. Besides the system integrated scenario, business requirements and interfaces design were provided in the report.

Work package 5 – Core Component Implementation

WP leader: Robert Mulrenin, SRFG

Introduction

WP 5 focuses upon the core components and infrastructure contributing to administrative unit ontology, query visualization, knowledge building and collaboration, server and tools for geospatial information, services and tools to support external components and QVIZ components, especially those that support access to archive material and administrative units related data from archive portals (archive resource hub, etc). Strong integration was expected and realized involving query visualization with the Administrative ontology infrastructure, geospatial server and tools, and social knowledge building collaboration environments.

The results of WP3 Knowledge and WP4 Specifications provided the basis for implementation and defined the necessary subtasks that were generally described in the work plan. Archival social bookmarking, archive resource descriptions with administrative unit and QVIZ archival portal services (Archive Hub) were the important integration points among and between the query visualization and collaborative environments – these data structures were then further exploited visually in WP6. To support “Query Visualization”, the faceted browser component was conceptualized from the WP2 State-of-the-Art investigation and it realized the advanced and supplemental tools for supporting query, advanced visualisation, and adaptive user interfaces necessary for WP6.

Objectives

The objectives for this work package are as follows:

- Provide fundamental tools for WP6 and prototypes 1 and prototype 2

- Support querying, visualisation and contextualisation of resources, and adaptive user interfaces
- Create knowledge tools for supporting the use of ontologies especially the time-spatial info from the admin ontology.
- Create collaborative knowledge building tools for ontologies and social knowledge content
- Create infrastructure for GIS support and integrating external knowledge and modules

Activities in Work Package

This WP was divided into five different tasks:

- Knowledge Tools
- Advanced tools to support query, visualisation and application prototype
- Social-Knowledge Building Component
- Adaptation to existing software that support selected external models
- Server and tools for Geospatial Information

A critical part of the project was successfully achieved that involved interacting with “external” knowledge either derived archival portals or from archival administrative unit data. Achievable solutions were planned and executed involving archival portal services (Archive Hub) to access data for the query visualization and collaborative environments. The subtasks relating to accessing archival materials at National Archives were defined in WP3, however, they were further refined or extended in WP5, especially taking into account the feedback from the first project review. Archives themselves provided prototype services and examples, final implementations for their accessing their resource descriptions (including administrative unit details) and the contributions to the European Administrative Unit ontology.

Within the collaborative environment, the archive services are also available to users for accessing digital content. Additional ISAD(G) XML or HTML descriptions are available depending on user needs. As defined in WP3, D3.1, the business model for accessing digital content resides with the archive portal, however, the services and QVIZ tools work together to enable the user to comply with the appropriate portal authentication procedure for accessing and viewing the digital content – it is the user who must obtain the necessary credentials for accessing the archive portal and paying any subscription fees.

The core geo-visualization components were also achieved – this infrastructure supports querying, visualization or time-spatial data coupled with the Administrative ontology (WP3), it's infrastructure implementation and the faceted browser component of the query visualization environment.

Work in the social knowledge building tools was completed. In WP6, more emphasis was on the Web 2.0-like interfaces, however, continued core tool support was provided from WP5 and WP6. An additional re-factored version providing another collaboration strategy was started and will contribute to the exploitation effort.

From WP4 Technical specifications and WP3, the WP5 tasks became more defined, especially T5.4 (Adapting to existing software/systems that support selected external models/systems). Achievements included the archive resource hub services, which involve middleware supporting interaction among QVIZ components and the archive portals.

Software and implementations were strongly influenced by the WP State-of-the-Art process; it's wiki based content was often used in partner technical meetings.

Results

The overall achievements have been to create the core infrastructure for use in WP6 for collaborative knowledge building, query-based visualization, administrative ontology, archive hub & supporting infrastructure, and geo-information.

Results achieved in the final phase of this WP, Core Components Implementation, includes:

- After the first year, the core components contribute to the work in WP6 and are also driven by refinements in the WP 4 Technical specifications and Use Cases. The toolkits support or comprise the components' implementations and do include work from WP6. In hindsight, the toolkits and prototypes might both have been released in WP6 because in the 2nd year, the WP5 and WP 6 were both open and contributing to the prototypes. D5.2 includes both the WP5 and WP 6 materials where appropriate, however the User manuals provide details on the User interfaces (UI) whereas D5.2 provides little UI presentation.

Work package 6 – Contextualization and visualization implementation

WP leader: Kalev Koppel, REGIO

Introduction

The purpose of WP6 was to integrate different software components and tools which were implemented in WP5 into a fully integrated and functional system.

The overall goal is to provide support for dynamic composition of interfaces to fulfil use cases and user requirements in the scope of supporting map contextualization and

visualization based on spatio-temporal features and the underlying ontologies employed by the Communities of Practice.

Objectives

The objectives for this Work package are as follows:

- Project Prototype portal implementation and integration of components and tools
- Create integration of social software components and knowledge content models in user interfaces
- Design visual interfaces for concept- and time-spatial retrieval of cultural heritage resources
- Create dynamic visualization of user queries connected to time-spatial administrative units

Activities in Work Package

This work package was divided into four different tasks:

- Tools for integration of social software components and knowledge content models in user interfaces
- Tools for dynamic visualization of time-spatial dynamics related user queries
- User interfaces for concept- and time-spatial retrieval of cultural heritage objects.
- Portal Application and Integration

WP 6 started in M12. Integration of core components implemented in WP5 started as scheduled. Technical partners – UMU, SRFG, REGIO – set up demo pages for the first prototype of the time-spatial client and the collaborative environment. The goal of the first prototype is to serve interactive user trials.

Several iterations of analysis, testing and coding were carried through in M12-24. The project review in May 2007 encouraged the consortium to concretize and narrow the scope of functionality and set focus on integration, which was seriously taken into account and was reflected in the WP4 deliverable D.4.1.3 which fostered development to intensify cooperation and integration between development partners. The prioritization was also a steering instrument to achieve more stable and more sustainable prototypes.

Results

The overall achievements have been to integrate different software components and tools, developed mainly in WP 4 and WP 5.

As the result of WP 6, several versions of the QVIZ Time-Spatial interface and Collaborative environment (CET) were published for serving interactive functionality and user trials as well as for demonstration purposes:

Results achieved in the final phase of this WP, Contextualization and visualization implementation, include:

- D6.4.2b, which included testable prototypes of the Time-Spatial Environment, and the Collaborative Environment, published as prototypes accessible through Internet: http://polaris.regio.ee/qviz_test (and a development version http://polaris.regio.ee/dev_test) and <http://qviz-dev.salzburgresearch.at/qviz/> This deliverable also included a user manual.

Work package 7 – Validation

WP leader: Tõnis Tärna, NAE

Introduction

The purpose of this work package is to validate the projects software and specifications, and also to assess the process toward achieving the objectives, as well as the evaluation of the prototypes and the final QVIZ platform.

All the activities within WP7 relied on close cooperation between partners and other work packages, the NAE, UMU and SNA held the leading position in the validation work and were heavily involved in this work package for the most part.

In order to assure the successful fulfilment of projects goals, WP7 has been working in close contact with research and implementation work packages (WP 5 and 6) and provided the developers with feedback from both system and end user testing trials. As a result of this kind of constructive cooperation, the project has met its main objectives – to enhance access to the archives and encourage increased usage of digital archival records. As for the specific objectives, WP7 has had a key position in mapping and mediating the needs of different target groups and user communities, as well as motivating community building and community based access to the digitized archival records among the focus groups through using the QVIZ platform.

Objectives

The objectives for this work package are as follows:

- To elaborate the methodology for assessment and review of the project's result and progress towards the project objectives
- Validation of software and specifications

- To assess the contextualisation content to be included into the QVIZ-framework
- Create the project's Communities of Practice and build the community knowledge that enables effective validation and assessment of the system
- To prepare and write a Case Study from user perspective

Activities in Work Package

This WP was divided into four different tasks:

- Design of assessment methodology
- Validation of software and specifications
- Preparation of case study and assessment of the system
- Case study of QVIZ and evaluation

In the course of the first year of QVIZ the main efforts were to define the validation and testing techniques and methods. This work provided an input for starting the validation of software and specification process, focusing on assessment of the requirements and user scenarios. Some preparatory activities were also initiated for preparing the case studies and the assessment of the system.

The second year began with finalization of the software validation and specification phases. The outcome was a detailed specification of projects target groups and a description of validation methodologies.

The validation process continued with sustained system functionality testing in accordance with the projects development status. During the functionality testing of QVIZ, all the prioritized use cases were tested and all the important functions were gone through in order to ensure that the system was ready for the possible end-users.

The results of the functionality testing created a foundation for the final step of the validation activities: a case study of the use of the platform by potential customers. Preparation of the case study and assessment of the system were treated together as a QVIZ usability testing. Some aspects of usability testing were addressed as early as during the first user trial conducted in spring 2007 alongside with the work on defining the main QVIZ target groups. In order to evaluate the usability of the QVIZ platform in relation to the user needs and expectation, there was a case study after finishing the development work on the project prototype 2b.

Results

The overall achievements have been to elaborate the QVIZ methodology for validation and also to conduct validations throughout the process.

Results achieved in the final phase of this WP, Validation, include:

- D7.1.2, *Software Validation Diary and Final Validation Report* – describing the validation of the QVIZ software in comparison to technical specifications and functional requirements.
- D7.4, *Evaluation Report of Case Study* – describing the process and results of the QVIZ usability testing, conducted in February and March 2008 in Sweden and Estonia. The usability testing was performed by focus groups consisting of selected representatives from QVIZ target groups.

Work package 8 – Dissemination and Exploitation

WP leader: Peder Andréén, SNA

Introduction

One purpose of this work package is to purpose reliable exploitation and dissemination procedures based on studies by the company customer base focused on customers' interests to contribute establishing a QVIZ Interest and Users' group. Another purpose is to publish key project activities and results on the Web site, and more generally, to disseminate project results broadly. That is, for the benefit of cultural knowledge communities and the distribution of dissemination material such as multimedia project presentations, leaflets, brochures, articles, etc. Furthermore, participation in relevant networks, scientific workshops and conferences has been important.

The tasks of WP 8 depend on the results obtained in WP 2 (Requirements) and WP4 (Technical Specification), in which the business requirements and target group of potential users and its requirements were traced. Also WP 7 has influenced the activities within the WP 8 due to the user evaluation and case study, providing a link between the training package and the use of tools.

WP 8 also depends on WP 5 and WP 6 results; the achievements obtained in the implementation WPs have been reflected in the exploitation activities through analysing the added value of the services offered and the results from the dissemination activities.

Objectives

The objective of this WP is twofold:

- To ensure the exploitation of the project results, partners participating in the project consortium need to obtain their return-on-investments (ROI) so that QVIZ outcomes can be also exploited throughout Europe.
- To ensure high-quality and far-reaching dissemination of project results

Activities in Work Package

This WP was divided into three different tasks:

- Exploitation planning – TIP
- Dissemination strategy
- Intellectual Property Rights (IPR) and knowledge protection

The activities within this work package can be divided into three different areas, which relates to the overall aim of this WP. They are market analysis, communication (internally and externally), and creation and maintenance of a knowledge reference network.

In the second phase of the project, the activities related to exploitation and dissemination continued as planned in the previous stage.

This WP has elaborated an exploitation plan, which contains a market study and identifies general actors and competitors of the market. It also reflects the partners special interest and internal exploitation plans. The exploitation plan defines the content providers' requirements, traces the development road map, and provides a view of the market strategies.

Dissemination activities have been undertaken, which have mainly consisted of disseminating knowledge both within the consortium and to the outside world - focusing

on potential users and customers. This knowledge transfer has been achieved through conferences, workshops, the QVIZ symposium, printed documents, leaflets, web sites, multimedia items, and posters. Also, dissemination tools and mechanism were developed and will be maintained

Results

The results of the tasks related to exploitation and dissemination activities are reflected in the following deliverables and milestones:

- D8.1, Exploitation Plan, which is a result of the iterative process in which several items were achieved. It went through a second draft from which the IR 8.2 Exploitation Plan was developed, and which was a precursor and continuation of first internal draft IR 8.1. The document contains the following aspects:
 - Reflections over all technical requirements needed for content providers.
 - Identifying the exploitable knowledge and how to exploit these results.
 - Agreements related to Intellectual Property Rights
 - Market analysis: strategies, actors, competitors, contacts.
 - Business models: market strategies.
 - Social impact

- D8.2, Dissemination Plan, which describes the many dissemination activities carried out, such as:
 - QVIZ results have been disseminated to the general public and potential users by the web site, in addition to the distribution of different communication materials such as, publications, leaflets, QVIZ posters.
 - The QVIZ web site, and the wiki knowledge creation from the whole consortium.
 - In addition project members have participated at many conferences, workshops, have performed presentations in order to spread and promote

the knowledge of QVIZ among the cultural institutions in Europe and events related to SIG issues.

- **QVIZ Symposium**, aimed at bringing together experts as well as European and international participants involved in digital libraries, digital cultural heritage and new media, European perspectives and international participation. This event combined critical and constructive perspectives from all the participants' fields of expertise and a QVIZ workshop in a one-track composition related mainly to the contextualizing of digital archives and library material. A range of speakers and discussants were invited from all over the world, which increased the value within the dissemination activities context, as well as from the discussions and conclusions obtained. Among topics addressed were the European Digital Library Initiative, deep access to digitized cultural heritage, best practice, innovative archival interfaces, and leading new media perspectives on digital archives.
- In the imminent future, QVIZ results will be disseminated and exploited by:
 - The National Archives of Estonia in the context of the EBNA meeting system
 - The National Archives of Sweden through their participating in the EUROPEANA/EDLnet expert- and work groups
 - The National Archives of Sweden through their participating in the evolving EPA/Apenet project
 - Umeå University, for example through the Demographic Data Base department and the proposed project *Historisk befolkningsstatistik på internet* (Historical population statistics on the internet).

Conclusion

The overall aim with the QVIZ system is to enhance access to Archival/Cultural Heritage resources through implementing an innovative time-spatial based search interface. In addition QVIZ also encourages users to collaborate participate in a mutual knowledge building process among Communities of Practice.

The general requirements can, as a result of the extensive analysis and knowledge building processes within the Consortium, be interpreted in a very simplified way such as:

QVIZ is a project that researches and develops solutions for users of the digital content in the public archival domain, even though the results can be used in other domains and for other purposes.

QVIZ is a project where usability is superior to internal archival structure which means that independence from the standards used by the archives for metadata capture has been an articulate objective in the requirements process.

QVIZ promotes the concept of Administrative Units (AU's) and place names as one way to primarily enter into digital archival content. This approach answers the spatial user question "Where?"

QVIZ develops time layers based on the changes to AU's over time as a means to create an easy understanding of changes in power structures and resource use in the past. This tool answers the user question "When?"

QVIZ researches and develops solutions to a significant conceptual problem within the archival domain - namely the often appearing inability to structure archival content into meaningful subject matters. This is done by the incorporation of user generated content in Communities of Practice. This development concept answers the user question "What?"

Through QVIZ innovative interface, and the concept of the need and appreciation of involving Communities of Practice in the knowledge building process, QVIZ contributes to an increased interest in European cultural heritage resources, and a higher degree of accessibility.