REGNET

Cultural Heritage in REGional NETworks

Deliverable D1

Analysis of the State-of-the-art and Development of Concepts

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Abstract	The document is divided into two parts. The first part is organised around the key components respectively conducted surveys of task 1.1. Starting from short descriptions of selected collections of the content providers the following elements are picked up: current practices at the side of the content providers, best practice examples, use cases and user requirements. The second part focuses on digitising aspects within the project. In order to support the content providers in digitising their objects a methodology has been developed.		
Keywords List	State-of-the-art, content provider, current practices, best practices, use cases, user requirements, theme-based approach, content preparation, digitising activities, digitising processes, tools and configurations for digitising, standards.		

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Executive Summary

The focus of this document lies upon the "Definition of content to be provided" at one side and “The digitising plans and activities” on the other side.

Part 1 is dedicated to the analysis of the current practices at the side of the content providers in different domains and to the provision of a guide on international best practice regarding the usage of digitised information in general and more specific for the usage of Internet for the presentation of collections (search and browse), communication and interaction with potential users, e-Business transactions, etc.

By examining and documenting the state-of-the-art in the cultural sector an orientation on well established trends and methods should be assured and features be identified to be applied to the REGNET System. The overall goal was to derive and to define functional requirements for the REGNET System to be developed, realised, updated and further specified during the next project phases. The approach chosen for this task was driven by the goal to analyse not only given structures and methods of data management but also to analyse concrete requirements and expectations of the content providers and their users. The methodology for this analysis is based on the study and description of the available collections and objects, the identification and description of the core business processes in the different domains and the definition of the requirements of the content providers and their users. Further on, this report describes existing and future products offered by content providers in the different domains, it specifies desirable use situations and conducts research in order to present the relevant environments. Starting from short collection descriptions (type of collection and objects, size and categories of items, covered themes and topics) the following elements are picked up:

- current practices at the side of the content providers (methods of data management like data structures and standards, extent of current documentation and digitising, usage of software),
- best-practice-examples in the different domains (with focus on excellent features to be adapted for the REGNET portal as well as worst practices to learn from),
- current and future usage of the system accompanied by individual expectations and goals to be reached by the REGNET portal site,
- concluding requirements in terms of use cases and functional requirements.

As part of the description of requirements and desirable features of the system the theme-based approach is introduced. The idea behind was to realise a technological, legal and operational framework wherein, mainly descriptive, cultural content can be created, edited, assembled, searched and consulted in a flexible and combinatorial way by a large community of information authors and users. The aim of the themes approach is to deliver substantial added value in areas such as education, electronic publishing and virtual exhibitions. Further on, themes will deliver supporting material in selling pieces of art or surrogates and offer new possibilities in the area of cultural tourism.

The digitising aspects are treated in Part 2. The purpose of the digitising activities in the context of the REGNET project will not be primarily to preserve rare and fragile collection items but to enhance access to the available collections in order to offer new business possibilities and to enable the partners to compete on the market by offering high quality digital assets. As the state-of-the-art analysis in the first part revealed, these collections vary widely in object type, size, quality and quantity. Besides real objects (to be found e. g. in museums), bibliographic objects in libraries and archives and media objects (surrogates like images, films etc.) must be considered in planning concrete documentation and digitising activities. Each of these object types can encounter some typical problems and must be handled in an appropriate manner. Just a minor part of the collections is already digitised, not all objects are even catalogued.

The methodology and results are reflected in the following paragraphs:

- descriptions of different models: one model deals with different types. Types of objects can be real objects like artefacts, maps, media objects like films or photographs as well as archival objects like charters or files. Another model deals with the type of digitising. The following types of digitising are taken into consideration: textual description, 2D surrogates of originals, 3D surrogates of

originals, electronic texts, electronic video and audio, automatic recognition of image/video contents,

- description of (digitising) processes. In this part a digitising plan has been developed, which shows the steps in the digitising process, describes alternatives and standards, gives advice how to proceed and provides a scheme for a production plan. The "general" digitising plan serves as a guideline for all digitising activities in the REGNET project. The general policy of digitising and the selection with regard to content and technological issues are described. The digitising plan lists all tasks (which can be tackled in sequence or in parallel) valid for digitising projects in general. The "modules" of the general digitising plan should allow to convert any individual collection according to the described procedures by considering the large number of variables, driven by the priorities, the institution, user needs, technical issues and available funding. It should help to consider all things needed to build up a digital collection: from the collection itself, the data that describes the objects and the user groups. Research looks also at the practical issues such as database requirements, the digitising process and use of standards,
- description of tools for digitising and (technical) standards gives a broader introduction into tools, programs and standards for every digitising model described above to provide recommendations. These matters are both state-of-the-art as well as accepted in a broad range of applications. Due to different experiences within single digitising models the amount of described matters is varying,
- presentation of best-practice examples. In this part The Austrian National Library describes its digital image archive
- customised digitising plans for all partners,

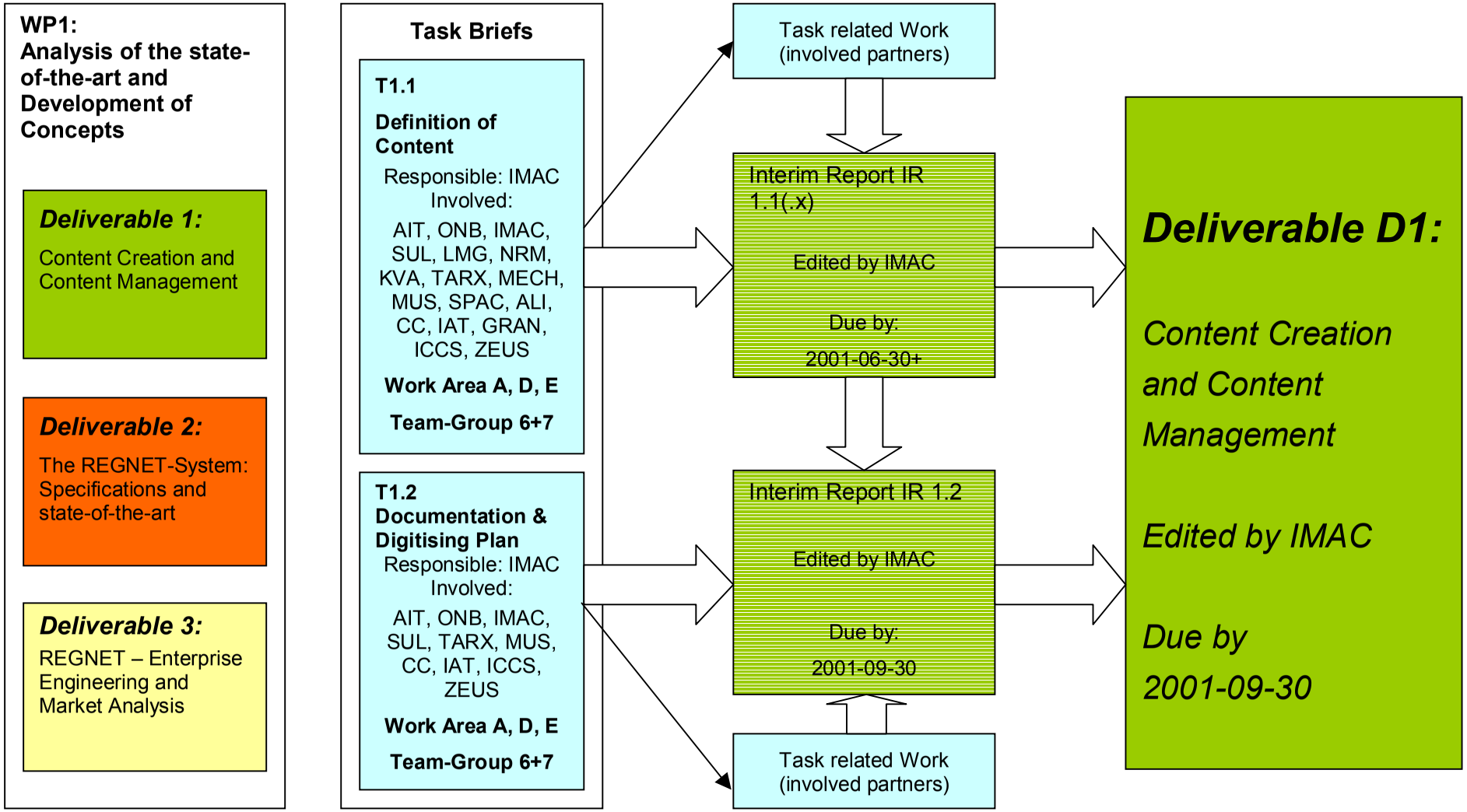
Results of other tasks like the thematic approach with its themes and fragments are worked out at the conceptual level with a few examples.

Situation

	Analysis of the State-of-the-art (WP1)				***Implementation of the System and Preparation of the Demonstration (WP2)***			
	Task	**Leader**	**Document**	**MM**	**Task**	**Leader**	**Document**	**MM**
Definition of content to be provided	1.1	IMAC	IR 1.1 → **D1**	21				
Development of a documentation and digitising plan	1.2	IMAC	IR 1.2 → **D1**	13				
Preparation of content and products					2.1	IMAC	IR 2.1 → **D4**	42,5

Task 1.1 is followed by Task 1.2. The implementation will be handled in Task 2.1 which will follow Task 1.2.

CONTENT ENGINEERING (Domain / Regional – specific)



Part 1 Definition of content to be provided

1 Introduction

1.1 Purpose

The world in the area of cultural heritage has changed, is changing and will change. Social, economic and technology changes are triggering factors for many new challenges in the whole area and a central task is to find adequate ways to handle these changes. In order to provide high quality digital assets and services which could make the REGNET System able to adapt to and compete on the market it is necessary to analyse the available content of cultural institutions and to consider the given framework. WP 1.1 "Definition of content to be provided" was dedicated to conduct such an analysis but sought to describe not only the current practices on the side of the content providers in different domains but also to provide a guide on international best practice regarding the usage of the Internet for presentation of collections (search and browse), communication and interaction with potential users, e-Business-transactions etc.

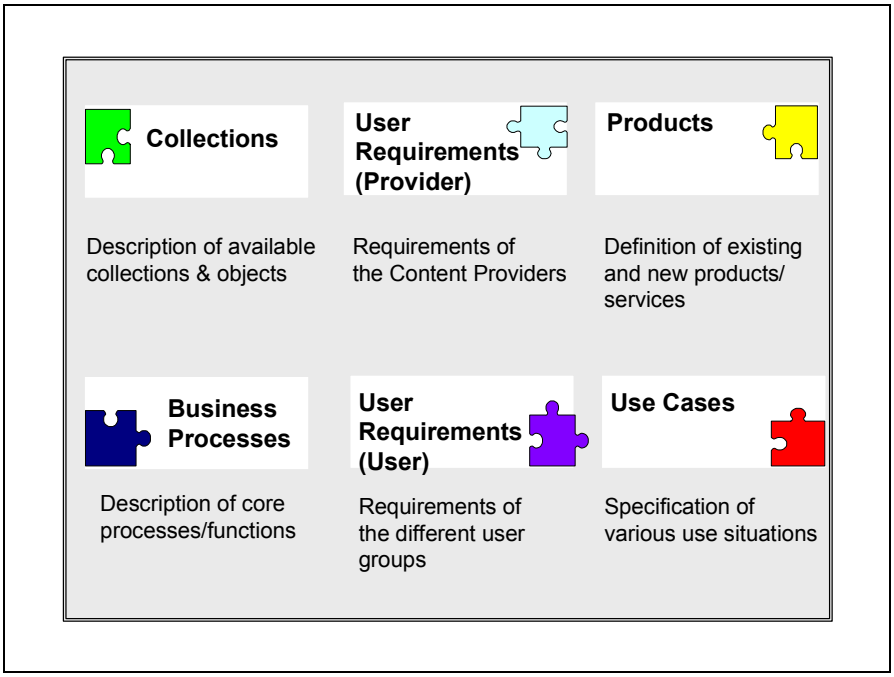


Figure 1: Objectives of the audit concept of WP 1.1

By examining and documenting the State-of-the-art in the cultural sector an orientation on well-established trends and methods should be assured and features be identified to be applied for the REGNET System. The overall goal was to derive and to define functional requirements for the REGNET System to be handled by Work Area B and to be updated and specified during the first project phase. The approach chosen for this task was driven by the goal to analyse not only given structures and methods of data management but also to analyse concrete requirements and expectations of the content providers and their users. The objectives, which guided the design of the study, are (Figure 1):

- To describe available collections and objects;
- To identify and to describe core business processes in the different domains (WP 1.6);
- To determine the requirements of the content providers and their users;
- To describe existing and future products offered by content providers in the different domains (WP 1.7);
- To specify desirable use situations (WP 1.6);

- To conduct research in order to present the relevant environment.

Some aspects covered in the overall audit concept are relevant for other tasks in WP 1 - synergies and overlaps are mentioned by indication of the WP in brackets.

1.2 Overview and document structure of Part 1

Part 1 of the Deliverable 1 focuses on the work and main results of Task 1.1 belonging to WP 1 and covers the first 3 months of the project. It is organised around the key components respectively conducted surveys of task 1.1. Starting from short descriptions (type of collection and objects, size and categories of items, covered themes and topics) of the collections of the content providers relevant for the project the following elements are picked up:

- Current practices on the side of the content providers: methods of data management (data structures, standards), extent of current documentation and digitising and usage of software;
- Best-practice-examples in the different domains (with focus on excellent features to be adapted for the REGNET portal as well as worst practices to learn from),
- Current and future usage of the system accompanied by individual expectations and goals to be reached by the REGNET portal site,
- Concluding requirements in terms of use cases and functional requirements.

As part of the description of requirements and desirable features of the system the theme-based approach is introduced. The idea behind was to realise a technological, legal and operational framework wherein, mainly descriptive, cultural content can be created, edited, assembled, searched and consulted in a flexible and combinatorial way by a large community of information authors and users. The aim of the themes-approach is to deliver substantial added value in areas such as education, electronic publishing and virtual exhibitions. Further on, themes will deliver supporting material in selling pieces of art or surrogates and offer new possibilities in the area of cultural tourism. The REGNET System must offer the possibility to construct new descriptive cultural content for consultation and publishing and should offer new access methods to cultural heritage besides the conventional search approach.

All questionnaires filled out by the partners and all other documents which have been produced during the Task 1.1 phase can be found in the document section of the project server. This report tries to summarise the main results, any additional information needed for understanding is provided within the Appendix.

1.3 Work plan and partners

The milestones, deliverables and expected results of the activities in Task 1.1 are outlined in the work plan (Table 1); the corresponding timeline is to be found in Appendix 1 of this report.

Task	
1.	Defining/Identifying all relevant domains
2.	Analysis of relevant clusters
2.1	Analysis of other projects and evaluation of the results
2.2	Best-Practice-Analysis
	- Development of a concept/work sheet for the analysis
	- Performance of analysis (Library, Museum Shops, Archives, Artists, Art Galleries, ...)
3.	Design of audit concept
3.1	Draft concept
	- Definition of scope
	- Selection of suitable tools
	- Design of work sheet(s)

3.2	Adjustment with Partners
	- Distribution to all partners
	- Enhanced feedback by partners (content provider, leader of 1.4/1.6)
3.3	Final audit concept
	- Work Sheets
	- Help to perform the audit
4.	Data collection and analysis
5.	Evaluation and Reporting

Table 1: Work plan of task 1.1

The following partners were directly involved in WP 1.1:

Partner Name	***Acronym***	***Task***
Information & Management Consulting, Berlin, GERMANY	IMAC	Task Leader: Task Management, design of work sheets, performing/co-ordinating the audit, IR 1.1
AIT - Angewandte Informationstechnik GmbH, Graz, AUSTRIA	AIT	Contribution to IR 1.1 (Conceptual issues), Design of work sheets
Österreichische Nationalbibliothek, Wien, AUSTRIA	ONB	Best-Practice picture archives, Processing of audit, Co-operation in theme inventory.
Stockholm University Library, Stockholm, SWEDEN	SUL	Best-Practice libraries, Processing of audit, Co-operation in the themes inventory.
Kungl. Vetenskapsakademien Royal Swedish Academy of Science, Stockholm, SWEDEN	KVA	Processing of audit, Co-operation in theme inventory.
Lansmuseet pa Gotland, Visby SWEDEN	LMG	Processing of audit, Co-operation in theme inventory.
Naturhistorika riksmuseet Museum Shop, Stockholm, SWEDEN	NRM	Processing of audit, Co-operation in theme inventory.
TARX nv, Hofstade, BELGIUM	TARX	Processing of audit, Description of themes approach, Leader of expert group themes. Definition of user requirements according to theme-based approach
Stedelijke Musea Mechelen, Mechelen, BELGIUM	MECH	Processing of audit, Co-operation in theme inventory and theme-based approach (expert group)
Museon, Den Haag, NETHERLANDS	MUS	Best-Practice museum shops, Processing of audit, Co-operation in theme inventory and theme-based approach (expert group)
Fratelli Alinari SpA, Florence, ITALY	ALI	Best-Practice picture archives, Processing of audit, Co-operation in theme inventory.
Consorzio Civita, Rome, ITALY	CC	Best-Practice museums, Processing of audit, Co-operation in the themes inventory. Results & Experiences of Hypermuseum.
Institute of Computer and Communication Systems, Bulgarian Academy of Sciences, Sofia, BULGARIA	ICCS	Best-Practice artists/art galleries, Processing of audit, Co-operation in the themes inventory.

Granollers City Council, Granollers, SPAIN	GRAN	Processing of audit, Co-operation in theme inventory.
SPACE S.r.l, Prato, ITALY (SPAC), Instituto Andaluz de Tecnologia, Sevilla, SPAIN (IAT), ZEUS Consulting S.A., Patras, GREECE (ZEUS)		

Table 2: Partners involved in WP 1.1

2 Current Practice

The description of the current practices on the content providers' side was part of the overall audit concept. The analysis of the current situation should provide necessary requirements for the planned tools and the portal – the actual situation gives the framework for the whole system development in order to assure an adequate consideration of individual needs of all partners. In order to collect standardised information and data about the different collections to be integrated in the REGNET portal, about technical equipment, currently used software tools, data formats and supported functions, an audit worksheet was sent to the content providers asking for the necessary information (Appendix 2). The main results are described in this chapter. The complete audit results can be found in the document section of the project server.

2.1 The collections

This chapter provides a short introduction to the different providers and the collections that will be included into the REGNET System. The participating content providers have in fact usually more than one collection but made suggestions about parts (e. g. about small thematic collections) to be integrated. Table 3 gives an overview of the different collections of the content providers - the final decision about the collection type and the amount of objects to be integrated in the portal have to be made dependant on digitising plans and policies within the project (WP 2) maybe also with regard to the theme-based approach and the selected themes (see Chapter 5). Further information given about the collections can be found on the project server.

Short Name	*Collection*	*Description*
ONB	Picture Archive (catalogue)	The digital image catalogue for the picture archive based on the typewritten card catalogue developed in the 1930s (1,207.305 catalogue cards). Various thematic focus, e. g. Habsburg. http://www.bildarchiv.at
SUL	Rare Book Collection	The Rare book collection (owned by KVA, maintained at SUL) with books and maps. 10.000 objects, selection with regard to covered themes (e. g. botany, zoology) http://www.sub.su.se
KVA	Portrait Collection	The Portrait Collection with portraits (2000) and photos (15.000), and manuscripts selection necessary (themes).
LMG	Museum Shop	Cultural history collection in the museum with 40.000 records and 5000 images in the picture archive, it was suggested to integrate objects of the museum shop. http://www.gotmus.i.se
NRM	Museum Shop	2000 objects in the museum shop: books, textiles, fashion, jewellery, surrogate animals CD-ROMs and CDs, video, posters, postcards etc. http://www.nrm.se . Selection of about 100 objects for REGNET

MECH	Museum Collection	12.000 objects: visual art, historical relics and applied art (crafts), selection according to thematic focus "Gods and Saints", Gilt Leather.
MUS	Museum Collection	Different object types (art, machines, textiles, films, videos, documents etc.): about 300.000 objects, selection according to themes: leather, gods and saints, measuring and science. http://www.museon.nl
ALI	Photo Archive	Archive with 3,5 Mio. objects out of different areas of interest, more than 65.000 digitised from originals (films, slides, vintage prints, daguerreotypes, collotype, and stereotypes). Selection necessary. http://www.alinari.it
ICCS	Art objects	Works of Bulgarian Artists (UBA) (paintings, graphics, sculpture, design, ceramics, jewellery, textiles etc.): about 500 objects. Probably also objects of Russian artists could be integrated (SUSU). http://www3.iccs.bas.bg
GRAN	Art objects	Works of visual art (paintings, sculptures, installations, net art etc.) from 30 young artists from Granollers.

Table 3: Collections of content providers

Art objects could be provided by GRAN and ICCS. Both collections belong to the domain "Artists & Art Galleries". INcivics, the Municipal Project of Young Artist's project of the Ajuntament de Granollers (GRAN), was founded in October 1994 as a platform for young artists from the area of Granollers, Spain. The collection chosen for REGNET contains the work of about 30 artists; information of the total number of objects was not given yet. The objects will be chosen from paintings, sculptures, installations, photography, etching, video art and net art of contemporary artists. The portal of the Union of Bulgarian Artists (UBA, represented by the Institute of Computer and Communication Systems at the Bulgarian Academy of Sciences ICCS) gives access to collections of about 500 art objects of contemporary Bulgarian art - stored, exhibited, offered by the members of the UBA (about 2700 in Bulgaria). The art objects are classified according to the Union's administrative organisation in 15 chapters: painting; graphics and illustrations; sculpture; critique; caricature; art space design; scenography; restoration; wall painting and monument art; design; ceramics; graphical design; new media and non-conventional forms; wood carving; jewellery; textile. The portal will operate as a permanent virtual gallery for the Union members.

In the domain ***Museums and Museum Shops*** collections of MECH, MUS, NRM and LMG are relevant. The Stedelijke Museum of Mechelen (MECH), Belgium, with its three houses Hof van Busleyden, Schepenhuis and Brusselpoort keeps around 12 000 objects strongly linked with the history of the city of Mechelen and the surrounding regions. It contains objects of visual art (sculptures, paintings, graphics), archaeological items (archaeological findings, instruments, utensils, documents, coins) and applied art-crafts (silver, bronze and copper, gilt leather, lace, furniture, tapestry, glass and ceramics, etc.) with a few thousand of items each. MUS The Stichting Museon, Netherlands, describes itself as a museum with an "educational mission". It contains 300 000 objects (3 D, documentation, images) like machines, textiles, stuffed animals, fossils, minerals, films, videos, images and documents, covering themes as natural history, physics and technology, history, archaeology and ethnography from prehistory to present time. For the REGNET project the Museon will use contributions from the ethnography, history and the physics and technology sections of its collections. Objects to be used will have to fit into the following themes:

- Leather
- Gods and saints
- Measuring and weighing
- Science

- Tour d'Horizon

The Naturhistoriska Riksmuseet (NRM), the Swedish Museum of Natural History, has collections with a total object number of 9 million items. They cover topics of natural history such as botany, zoology, geology, palaeontology and astronomy from the start of the evolution to the 20th century. The museum shop, which will be part of the REGNET project, contains around 2000 objects like books, presents, surrogate animals, posters, CDs, calendars, paperwork textiles, reproductions, postcards, maps, stones, minerals and jewellery. Part of the stock is changed according to actual exhibitions, tax costs etc.

The Länsmuseet på Gotland (LMG), Sweden, presents around 40 000 cultural history objects from the Stone Age to the present day. In addition it maintains a picture archive with over 5000 records. The museum shop offers copies /originals from various fields of the museum collection and handicrafts and its stock is scheduled to be the Länsmuseet's contribution to the REGNET project. They are also contributing to the SAINTS-theme.

ALI and ONB are the main partners for the domain ***Picture Archives.*** Fratelli Alinari (ALI) is the leading Italian picture archive, keeping 7.500.000 photographs done by 5000 different photographers. 3.500.000 belong to Alinari itself. The pictures cover a wide range of topics like art, architecture, travelling, agriculture, industry, history, movie, fashion, theatre, science and technology from 1852 until today. The database is already online offering access to the collection database along with e-Business functionalities; a great know-how in the field of e-Business and digital watermarking is available through this partner(http://business.alinari.it). Figure 2 is a screenshot of the business site of Alinari.

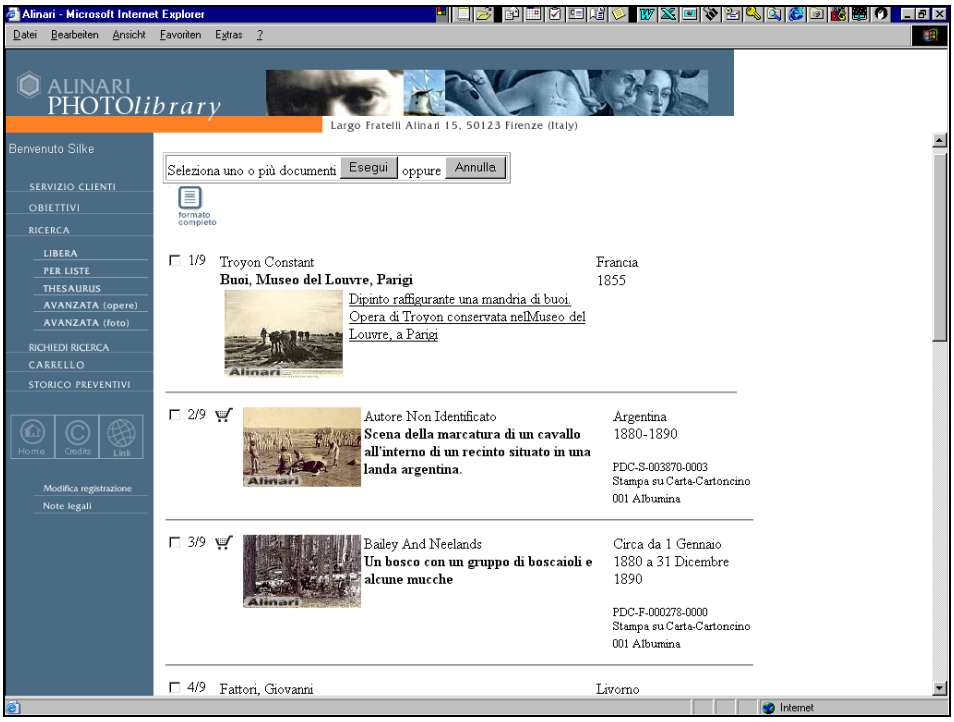


Figure 2: Screenshot Alinari Business Site

Die Österreichische Nationalbibliothek, the Austrian National Library (ONB) keeps around 1,5 Mio. pictures in its "Porträtsammlung, Bildarchiv und Fideikommissbibliothek". It features topics as the Habsburgs, especially the Emperor Franz Joseph, Elisabeth and other members of the imperial family, topographical and architectural photographs: with special focus on Austria and Vienna, contemporary history: e.g. the photo archive of the United States Service 1946-1955, portrait photography of artists, politicians, scientists, celebrities and outstanding persons, theatre photography: e.g. the Salzburg festival and special collections of individual photographers (focussing on architecture, landscapes, foreign countries, theatre, celebrities, portraits, reportage) mainly from 1850 to the present day. The online version of the picture archive is already available as a test version (http://www.bildarchiv.at) and

could serve as another best practices example, especially with regard to the professional search options along with the design (Figure 3).

The 4th domain identified as relevant for the project is the domain of ***Libraries*** to which the Swedish partners SUL and KVA could be assigned. The Stockholm University Library (SUL) and the library of the Royal Academy of Sciences (KVA) merged their collections in 1978. The whole library catalogue is available at http: http://cat.sub.su.se. For the REGNET project both partners decided to contribute the Rare Book Collection which is owned by the KVA, but placed and maintained at the SUL. The Rare Book Collection contains about 10 000 books, manuscripts and maps about natural history (zoology, botany, travel, physics, and astronomy) from 15th to 19th century. The Royal Academy of Sciences is however mainly an archive and as such they contribute a selection of their portraits and surrogate instruments to the REGNET project.

Further collections (or parts of collections) could be supplied by AIT and IMAC. AIT has a license agreement with the owner of the "Basler Plakatsammlung" with a large amount of digitised posters (34.000). The collection is available for testing purposes. Likewise parts of the "Datenbank Schweizer Kulturgüter" and objects out of the Habsburg Project by IMAC could be integrated. The final decision about possibilities to integrate parts of the Musei Capitolini through CC is still open.

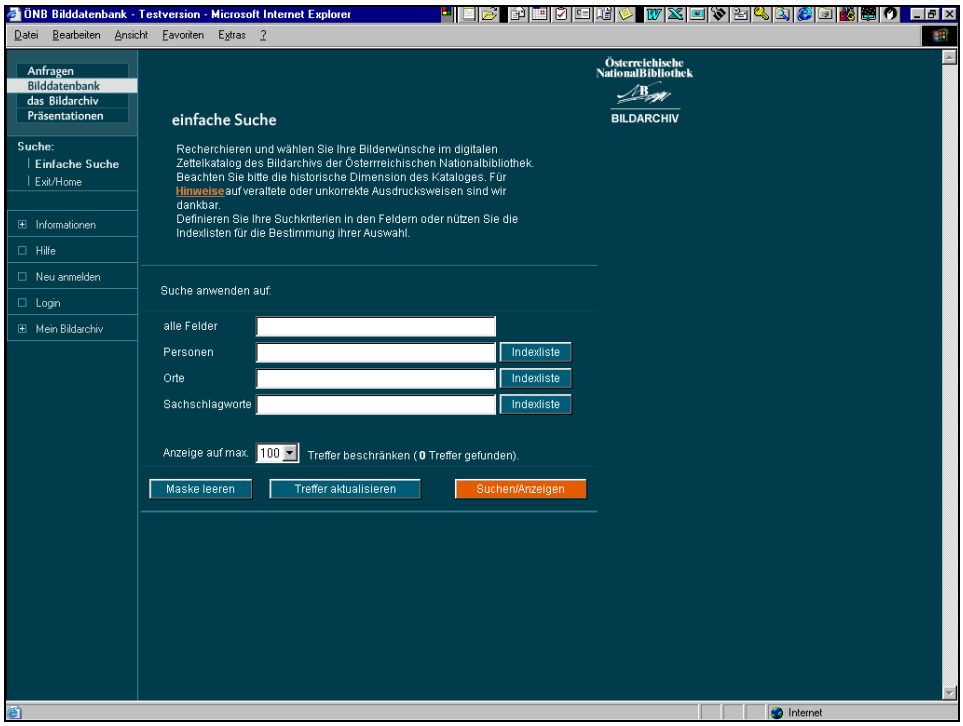


Figure 3: Screenshot Bildarchiv ONB

The collection-overview shows that the "potential" content basis for the project covers a variety of themes and categories of items: From visual art to historical relics, from books to presents and toys offered in the museum shops. A selection has to be made which takes into account the goals of the project, the needs of the potential end users, the available personnel and financial resources, and already catalogued and digitised objects. This task is dedicated to WP 1.2 “Development of Documentation and Digitising plans”.

2.2 Software and Hardware architectures

The existing technical infrastructure on the side of the content providers must be supported – all tools for the “professional” users should consider their technological equipment and future planning. The platform for the professional usage must be processed in the given environment – a requirement which is especially in the light of Internet technologies a standard claim. Therefore a summarization of the corresponding results of the audit is not really necessary. Moreover not all partners managed to answer the questions on technical requirements.

As far as possible a comprehensive overview of the results in terms of used operating system (OS), database management systems (DMS), available application software (AS) and network architectures (NWA) and software will be given in Table 4. All missing information is marked by N/A. (no answer); partners who did not answer are not listed in the table.

The basis in almost all cases is a windows-based operating system (NT, 2000, 98, 95) and the usage of Microsoft Office. PCs are connected in networks based on standard network protocols. Relevant application software is mostly domain-specific and will be commentated in the next chapter as well as migration plans which concern mainly data management issues (collection management), e. g. the planned introduction of museum collection management systems, shop systems for the museum *shops etc.*

Short Name	***Environment***				
	OS	DMS	AS	NW	Other Remarks
ONB	Win NT 4.0, Win 95, Win 2000, Linux (Partly)	Star	MS Office File-maker, Allegro	Yes (Client-Server)	About 200 each, 30 in the picture archive.
KVA	Win 2000		MS Office 2000	Yes	
SUL	Win 2000, NT SUN Solaris	Oracle	MS office 2000 Voyager Oracle-based library management system	Yes	About 250 simultaneous users.
LMG	Win 98	ADLIB.	MS Office 2000 pro	Yes	Network standard: Ethernet with RJ45 connections. 60 users.
MECH	Win 98	N/A.	MS Office 2000	Yes	Network standard: Ethernet with RJ45 connections
MUS	Win NT	SQL, Access	MS Office 97/2000	Yes	Museum network: 100- 10 bit; Users: 100, about 90 workstations.
ALI	No "general" information given, only domain-specific software for image archive				
ICCS	Linux	MySQL	N/A.	Yes	

GRAN	Novell	Novell, Database Engin-eering: Oracle, Database programm ing tools: Access	MS Office 97		Network architecture: client – server Number of users: 278

Table 4: Hardware and software currently in use

2.3 Data management

The Internet will be the future medium for the exchange and the distribution of cultural heritage. In order to use the given potential, documentation and digitising of the collections is necessary - a requirement and claim that the REGNET project recognizes and tries to support. The development of tools for professional users (the content providers) is one of the main goals in order to build up the basis for data interchange and search in heterogeneous and distributed collections. Therefore the analysis of the state-of-the-art of Task 1.1 was also dedicated to the methods, systems (paper-based systems as well as databases) and standards currently used for the data and collection management. The REGNET System must cope with diverse technologies and data structures. Whereas not all parts of the available collections are already catalogued and digitised moreover the degree of documentation and digitising prescribes the effort and steps necessary to build up a virtual REGNET catalogue.

In the following paragraphs the state-of-the-art on the side of the content providers is described. The databases and tools are listed in Chapter 2.3.1, the degree of digital storage and the formats used for formal and subject description of the collections is summarized in Chapter 2.3.2.

2.3.1 Methods and Systems

An important precondition for the improvement of access to cultural heritage is the availability of databases with cultural heritage information (object information, images and reference documents). In the past years much effort was made to base this development on international standards and electronic systems. The (software) market offers a number of standard tools to be used - but even though the conditions were improved and the cultural heritage institutions tried to cope with the new challenges, the process is still in progress. This assessment is also valid with regard to the content providers involved in the REGNET project:

- Whereas in most of the cases catalogues (and thereby bibliographic descriptions) of the objects exist, the transition to electronic systems is not finished. Especially larger institutions have begun to digitise their traditional card catalogues.
- Some partners already work with domain-specific collection management software (Star, Libris, Museum Gallery, Adlib) based on international standards (see also Chapter 2.3.2). These systems provide access to parts of the collection; paper-based systems however still are used.
- If digitising activities have already started, the degree of digitising varies. Players like ALI could provide a substantial amount of digitised objects, while most of the partners which have just started can provide a smaller selection (on the average some hundred objects).

The detailed description of actual data management per content provider can be found in Table 5. Migration plans are also stated there.

Short Name	***Data Management Tools & Systems***				
	Documentation			Digitising	
	Paper	Databases	Others	Digital objects	Tools

ONB	Card Catalogue	STAR	Software KATZOOM for searching in the digitised catalogue	Catalogue Cards	-
	Digital image catalogue in STAR with 1,207.305 items on the basis of typewritten card catalogue. STAR will be the new image database of the Austrian National Library. In addition to the library system ALEPH, STAR will cover cataloguing, documentation and customer services for the collections of the Austrian National Library. A test version of this database is already online. An enhanced test version is planned for July 2001.				
SUL	Card Catalogue	Libris, Voyager	-	-	-
	SUL is cataloguing in Libris on the basis of MARC. LIBRIS will convert to MARC 21 by January 1, 2002.				
KVA	Card Catalogue	-	-	Images of objects	-
	Card catalogue for portraits and photos, a minor part of the photo collection is digitised.				
LMG	-	MS Access	-	JPEG-Images of objects	MS Access
	MS Access database for records (40.000) and digitised objects (5000).				
NRM	x	Electronic listing of items	-	-	-
MECH	Card Catalogue	Adlib	WP, Word	-	-
	MECH has catalogued its objects on 7000 catalogue cards, only a few hundred of them are recorded by the collection management system ADLIB, some items are catalogued in WP (40) and Word (120). Plans: The deployment of the collection management system ADLIB Museum (on going).				
MUS	x	Museum Gallery	-	JPEG-Images of objects	-
	60.000 objects are searchable by an automated collection management system: the Museum System (Gallery System, 2200 images are digitised).				
ALI	-	x	-	JPEG-Images of objects	Different Tools
	More than 65.000 images are digitised (JPEG) with different resolutions. Different additional tools for the management of the image database: Digimarc (ImageBridge Pro) for watermarking, Adobe Photoshop 6 for picture enhancement, Barco Reference Calibrator monitors for colour accuracy, X-RITE and ICC Colour profiles for colour calibration, Specific software for DB management (EasyWeb, EasyCat, and in-house software for e-Business).				
ICCS	-	MySQL for Linux	-	JPEG-Images of objects	-
	About 500 objects catalogued in database, only 60 images are digitised as JPEGs.				
GRAN	x	-	-	No digitised objects	-

	Most of the objects of the collection are still not catalogued in any way. It is planned to implement a database system to catalogue the collection and to design a web site on INcivics as well as the inclusion of the artists and their works on photography and image (video creation and net art) in the Aire F's web site (which belongs to the Alliance Française).

Table 5: Data management methods and systems

2.3.2 Data structures and standards

This chapter will give an overview of the data formats in use and summarise these issues according to the given information. Detailed information on the partners' data structures (on the basis of internal standards or own developments) can be found in Appendix 3 of this report if such information was supplied by the respective partners. The currently used methods for the formal and subject description of objects in existing paper-based and electronic system could be described in different models:

- content providers that have started with their own database developments (or have not yet started) use their own data structures developed with regard to practical issues (see example of ICCS in Appendix 3). The number of fields varies for different purposes,
- content providers using collection management systems are stuck with the standards supported by the software. These standards are mostly established standards in the corresponding domains, minor individual adaptations are possible (e. g. ADLIB-supported standards, usage of SPECTRUM for STAR databases, Libris Marc),

Due to the small number of involved partners per domain, a domain-specific interpretation of given data is not really useful, no coherent picture could be drawn. Under these circumstances the listing of standards (no individual developments) given in Table 6 runs the risk of being isolated cases with no generalized significance. These restrictions must be considered when interpreting the results.

The subject classification methods and in general the usage of controlled vocabulary are much more heterogeneous. Adaptations of an international system or own development could only be found in larger cultural heritage organisations (e. g. ALI which participates in the development of a proprietary standard in collaboration with the University of Florence). The database and the iconographical tree have been created following the remarks, suggestions and revisions from several worldwide museums, libraries, photographers and stock agencies, details in Appendix 3)

The challenge for the design of the ontology node will be the handling of such different vocabularies, thesauri and classification schemes (for details if available, see also Appendix 3). The development of the theme-based approach carried out in the project (see chapter 5) provides an additional way to offer thematic access to object information and objects.

Domain	***Standards***	
	Formal Description	Subject Description
Museum	Cidoc Guidelines, Spectrum	AAT, TGN
Archive	Spectrum, in the future AMICO	PND (Personal Norm Data)
Library	MARC, MARC 21	Regional System : SAB (Swedish Classification System)

Table 6: Standards in use in the different domains

2.4 Existing services for internal and external users

The analysis of available services and products on the side of the content providers build the basis for the development of a product-marketing strategy. One section of the conducted audit was dedicated to such an analysis which could not and should not claim to be complete in terms of market analysis but aims to provide basic approaches for the development of a product portfolio for the whole REGNET System.

2.4.1 User Groups

Due to the fact that not only end users, but also internal (professional and business) users have to be supported and attracted by the REGNET System the listing of existing products and services was made distinguishing between these groups. With regard to the results of the audit the following users could be assigned to the groups. Some users may be mentioned in both groups depending on their actual functions. The provided structure is not the final one but serves the purposes of this report:

- *Internal users* in the different domains are the staff working on collections (librarians, archivists, registrars), service providers like restoration employees, photographers, software and image engineers, staff in the customer services, administrative staff and content and business partners like artists and art galleries.
- *External users* (potential end users) are the public users like visitors, students and academics, children and school classes, tourists, public authorities, as well as users with a professional or business background like editors, graphic designers, television, publishing companies, business representatives, art galleries, museums, scientific institutions collectors and buyers.

Each group is indeed bound to different use situations and aims to use the system in different ways according to the actual professional and private background. As far as objective of WP 1.1 the description of (future) use situations and use cases would be given.

2.4.2 Products and services

The existing products and services build the "basic" functionality of the REGNET System - as stated before improvements must be made in order to provide added value not only to users already envisaged but also to potential new users. Existing services in the different domains as far as stated by the content providers are listed in Table 7 to Table 10.

		Services for internal users	Services for external users
Artists/Art Galleries	Conventional Services	Services for the artists and art galleries (seen as internal users) e. g.: - Promotion of artists & art galleries - Inclusion of new artists & objects - Preparation of artist's collection on CD, electronic repositories (also as online products) - Generation of conventional products related to the artist work (postcards etc.)	- List of actual & previous exhibitions - Products related to art work: postcards , artist's collection on CD (also online, see below) - Art catalogues - Educational services
	Online Services	For administrative purposes: - Searchable Database - Reports For artists and art galleries (seen as internal users): - Electronic (online) repositories, access through internet - Help Desk	- Searchable database - e-Publishing/Virtual Gallery also with predefined selections, e. g. list of artists from a city, list of works per artist/year, thematic selections - Auctions/e-Business (Ordering of items)

Table 7: Services offered in the domain artists/art galleries

		Services for internal users	Services for external users
Museum/Museum Shop	Conventional Services	- Paper catalogue cards - Printed reports (Content s depending on information wanted)	- Contents for guiding purposes - List of new items - Actual exhibitions - Museum shop catalogue In principle all features for internal users could be given to external users.

	Online Services	- Searchable database
		- Image gallery
		- Reports (on demand)
		- Other functions provided by collection management system(s), e. g.:
		  - work set creation
		  - user profiling facilities
		  - data entry system
		  - data editing system
			- Searchable database
			- Web Site
			- Museum Shop

Table 8: Services offered in the domain museum/museum shop

		Services for internal users	Services for external users
Picture Archive	Conventional Services	Services for customers (seen as internal users) e. g.: - Generation of products like books, postcards, artist prints and reproductions Services for administrative purposes (for registrars, archivists, editors etc.): - Catalogue cards	- Man-powered search - Exhibitions - Processing of orders - Products like books, postcards, prints and posters
	Online Services	- Searchable database/search engines - Tools for data input and editing - Tools for image engineering (compression, digitising, etc.) - Online help	- OPAC / searchable databases for objects, fees and copyrights, formats and quality - Online watermarking - Online customer service - Remote administration

Table 9: Services offered in the domain picture archive

		Services for internal users	Services for external users
Library	Conventional Services	- Catalogue cards	- Conventional library services: Searching in the catalogue, loan of items, ...
	Online Services	- Tools for data editing and administration - Searchable databases and (OPAC)	- OPAC Databases Electronic journals, Internet - Online Ordering and other

Table 10: Services offered in the domain library

As mentioned before this product portfolio would and should be supplemented by the results carried out in the analysis of best practice examples (see Chapter 3) and desirable use situations respectively user requirements (see Chapter 4) in order to be able to compete on the market (with innovative products and services).

Without anticipating the use case and user requirement description some main conclusions should be made. With regard to the expectations of the partners and their users especially the necessity of product improvements and the adaptation of new technologies must be stressed:

- to *facilitate* the access to cultural heritage. Not all partners can offer online access to object information and objects, search must be done by visiting the cultural heritage institution, by man-powered searches or by using the conventional card catalogue and other paper-based instruments),
- to *enhance* the information about objects and cultural heritage information by providing additional possibilities of presentation and searching (e. g. by establishing a co-operative information pool and electronic market),
- to *support* and thereby streamline internal processes with the provision of new tools (for data editing, searching and product generation),
- to *use* the potentials of the Internet in order to support the exchange with the professional community and to enhance the marketing activities.

3 Best practices - State-of-the-art

3.1 Methodology of the survey

The best-practice-analysis is one proven instrument in the product development process, chosen in WP 1.1 in order to assure an orientation of the REGNET portal on the international *state-of-the-art* in the field of cultural heritage. By identifying and analysing applications which are in some aspect outstanding in the different domains, an overview about the market situation should be given. Best-practice-analyses reveal successful concepts of sites available on the Internet and thereby permit conclusions for the conception of a new site. Typical and well-established features as well as innovative ones should be identified in order to be able to compete on the market. Typical features build the state-of-the-art in terms of minimum requirements and *need* to be adopted. Practices that seem excellent *can* be taken up; worst practices *must* be avoided. In order to stimulate the development process the results of this analysis could also provide and thereby allow a "working by examples".

The analysis followed a questionnaire worked out in order to get standardised data about relevant applications project. The questionnaire could be found in Appendix 4 of this report. The individual surveys have been executed thoroughly for the different domains - altogether 28 surveys supplemented by an additional analysis on shopping carts and checkout interfaces. Table 11 lists the partners involved in the analysis and responsible for the submitted data.

Partner	*Domain*	*Analysed Sites*
SUL	Libraries	ELISE II http://nile.dmu.ac.uk/ elise/el_demo_screens/new_grey/demo.htm The British Library homepage http://www.bl.uk/ Helix http://www.helix.dmu.ac.uk/ Libris http://www.libris.kb.se Visual Arts data service http://vads.ahds.ac.uk/ ONB: http://www.onb.ac.at
CC	Museum	Istituto e Museo di Storia della Scienza di Firenze http://galileo.imss.firenze.it Louvre http://www.louvre.edu/ Metropolitan Museum of Art http://www.metmuseum.org Museum of Modern Art http://www.moma.org/ Museo della Scienza e tecnica “Leonardo da Vinci” di Milano http://www.museoscienza.org/
MUS	Museum Shops	British Museum Company http://www.britishmuseum.co.uk Brooklyn Museum of Art http://www.bmashop.com Louvre Museum Shop http:// www.louvre. Metropolitan Museum of Art http://www.metmuseum.org Museumshop.com http://www.museumshop.com Rijksmuseum Museum Shop http://www.rijksmuseum.nl SmithsonianStore.com http://www.smithsonianstore.com
	The analysis was supplemented by an analysis of the site http://www.dack.com/web/shopping_cart.html regarding shopping carts.	
ONB	Picture Archives	Bildarchiv zur Kunst und Fotografie in Deutschland http://bildindex.de f1 online http://f1online.de/ National Archives and Records Administration / NAIL http://www.nara.gov/nara/nail.html, http://www.nara.gov/research/jfk/jfk_search.html
	The analysis was supplemented by ALI for CORBIS (U.S.A.) http://www.corbis.com, BRIDGEMAN (U.K.) http://www.bridgeman.co.uk/ and SCALA (ITALY) http://www.scala.firenze.it/	
ICCS	Artists/Art Galleries	AskArt http://askart.com Workingwithartists http://www.workingwithartists.co.uk Art Gallery online http://www.art-gallery-online.org Artcnet.com Fine Art Gallery http://www.online-artgallery.com Christie’s http://www.christies.comchristies.com

Table 11: Responsible partners for the Best-Practice Analysis and analysed sites

All sites evaluated are accessible on the internet, the whole analysis was restricted to features which are offered for free to "public" users, conclusions drawn out of the conducted analyses must be consequently restricted to the "visible" side of the application. Emphasis was laid upon:

- the *description of the underlying content base* and *services related to the content*, especially services offered for search and retrieval, e-Business-activities, "personalisation" and user profiling (value added services),

- addressed *user groups* (as far as recognisable) and *use scenarios* (as typical user questions which could be answered)
- chosen methods for the *object presentation* and *user access methods*, i. e. navigation aids, access for special target groups etc.

Chapter 3.2 summarizes the main results in the different domains by resuming especially the best-and worst practice statements. Detailed conclusions relevant for the functional design of the REGNET portal were taken into account at several stages of the development process, some results will be picked up in the context of this report in connection with the description of use cases (Chapter 4). The complete work sheets filled in by the partners could be found on the project server. The whole analysis will be completed by taking a look at another European project "The Hyper museum" which offers further hints to new access methods to cultural heritage. Due to the importance of theme-based concepts which are of specific relevance to the REGNET portal the concepts realised in this project offers further hints to the later REGNET portal.

3.2 Best practices in the different domains

All results presented in the chapter aimed to give a short description of the analysed sites and to stress the specific features detected as possible best practice examples for the technical development of the REGNET System. Each sub-chapter follows a specific structure: the analysed sites are listed with name, URL and provider. For each site a short description will be provided and in order to stress the relevant conclusions at the end of this description the best practice features will be highlighted. If necessary and possible each chapter is summarized at the end with regard to conclusions relevant for the REGNET project.

3.2.1 Best practices in the domain Libraries

The analysis conducted for the domain Libraries comprises 5 applications which are listed in Table 12.

ELISE II is an interesting project with regard to the realized distributed system even though it has not started as a working system. The main components of the system are a searchable database, the ordering of documents/photos etc. and the financial information section. Interesting best practice features could be as mentioned before the *distributed system* based on standards such as Z39.50 and Dublin Core. According to the information given on the demonstration system "an enhanced web server manages multiple distributed search queries, using the Z39.50 Search/Retrieve protocol. The DBIS then determines which databases should receive the search query, and sends the appropriate messages. Replies come back from each database management system relating to the number of records found matching the query. These results are passed back to the BROKER and then on to the JAVA user interface for display. Database suppliers can continue to manage their own data, so material is always up to date. And, using International standards, it is relatively easy to expand the system to include more services." Other best practice statements refer to the well structured, logical and easy to *use-interface* and the catalogue which is powerful with a simple and advanced search interface (web-interface). A thesaurus is implemented and there is a link between the images, so that a group of images can be displayed.

> *Best-Practice features*: Distributed system based on standards. Well-structured system, logical and easy to use. Powerful catalogue with a simple and advanced search interface. Thesaurus and linkage between images.

The British Library homepage. This site gives access to the many different services of the British Library, e. g. searchable catalogues and digital library, picture library and commercial transactions. Especially the catalogues follow a high standard interesting for the project. The Digital Library has the highest possible standard in selection, quality of images and catalogue. The Background story of selected books and manuscripts is scientifically correct and well written which makes it interesting for the ordinary reader as well as the professional. There is also access to background description of related themes. The handling of themes and backgrounds is well worth studying for the REGNET project. The information is well organised. The different catalogues OPAC and web have high standards. Nice features are relevance ranking, including of items of different dates (as recent as 2 days ago), possibilities of refining the search after seeing search results. There is integration between

the catalogue and other services, such as ordering of documents and a very well functioning delivery service.

Best-Practice features: High standard catalogues. Background stories of selected books and manuscripts and background description of related themes. Nice features in the OPAC: relevance ranking, refining the search. Integration between the catalogue and other services.

Name	***URL***	***Provider***
ELISE II	http://nile.dmu.ac.uk/ elise/el_demo_screens/new_grey/demo.htm	DeMontfort University
British Library homepage	http://www.bl.uk/	The British Library
Helix	http://www.helix.dmu.ac.uk/	DeMontfort University United Kingdom. The rest of the consortium: Hulton Getty Picture Collection, St. Andrews University Library, Social and Political History of Great Britain
Libris	http//:www.libris.kb.se	The Royal Library Stockholm Sweden
Visual Arts data service	http://vads.ahds.ac.uk/	The Visual Arts Data Service (VADS) which is based at The Surrey Institute of Art & Design, University College. VADS is a part of the Arts and Humanities Data Service (AHDS). The AHDS and VADS are funded by the Arts and Humanities Research Board (AHRB) & the Joint Information Systems Committee (JISC).
Digital Image Archive	http://www.onb.ac.at http://www.bildarchiv.at	The Austrian National Library

Table 12: Analysed sites in the domain Libraries

The Helix service is developed from a project led by De Montfort University and commissioned by the JISC to investigate the needs of the UK Higher Education community in relation to the digital storage and network delivery of image based information. The final report is titled Proposal for an Image Data Resource service and can be obtained from the JISC. There are 52.000 high quality images free to Higher Education. DMU provides 15.000 images from the National Arts Slide Library, Leicester Record Office, Leicester City Museum, Hartill Art Association and the University of Leicester (Department of Local History). Hulton Getty Picture collection provides 15.000 images from the 2.5 million in the Picture Post collection, St Andrews University Library provides 15.000 images mainly from the James Valentine collection (a postcard archive of photography over the past 100 years) and items from George Cowie and Robert Adam collections. The Social and Political history of Great Britain (The SPHB collection) is considered the best known library in the world on photojournalism. From this collection 7.000 images are provided from 6 themes, spanning the period 1859 to the present.

Best-Practice features: Good quality of the images. Fast system and easy-to-search database. Full record information could be displayed with technical fields and classification, subject and description fields.

Libris is the Swedish database for the input of Swedish research and special libraries containing around 6 million records. It is the database for the National Swedish Catalogue. LIBRIS database also contains books, journals, journal articles, posters and Swedish imprints before 1700. Swedish imprints before 1700 is a pilot study serving a number of purposes, of which the all-embracing one is to attain

suitable methods for bibliographic description and computer based solutions when presenting material from the Royal Library's (KB) older collections. Older publications have always been of interest to the general public but have not been easy to access. By presenting these items in this format they are made more readily available for the merely interested as well as the specialist. It also has the added advantage of serving the books in a protective capacity. One objective when digitising older publications is to attain a certain level of quality in the reproductions to render the reading and handling of the library's own copies as superfluous. The project can be looked upon as an "exhibition» addressing itself to an interested general public and researchers well conversant in the history of books. The selections have been made to correspond with different subject fields and different periods in time during the 16th and 17th century. Suitable for the REGNET System are some features from the *catalogue*. The book-titles can be retrieved from the LIBRIS database. The texts fit in with the idea of themes in the REGNET project. Good quality in cataloguing and the linking between traditional catalogue and the web is interesting.

The LIBRIS web-catalogue is on the whole clear and user-friendly. The catalogue composes of a short version and a full version with a number of search options. The format with title, author etc on display at once is probably more user-friendly for inexpert searchers than the traditional Z39.50 “pull-down approach”.

> *Best-Practice features*: LIBRIS database with texts fitting in the idea of themes. Good quality in cataloguing, clear and user-friendly interface. User-friendly format with title, author etc. Linkage between traditional catalogue and web.

The **Visual Arts data service** (VADS) provides Internet access and preservation of its collection of visual arts in digital form. VADS aims are to provide collections of visual arts digital resources and advice for their creation, to preserve visual arts digital resources to ensure their long-term use, to promote good practice for the creation and use of visual arts digital resources. All collections are provided via the Internet in suitable web-delivery formats. Resources delivered by VADS include: Image databases from the Imperial War Museum, Fashion, National Arts Education Archive and the Design Council Archive. Best-practice arguments result out of the provided Best practice on Creating Digital Resources for the Visual Arts: Standards & Good Practice and again the catalogue with different types of object presentation. The catalogue is good with a simple and advanced version. It is possible to limit the search to a number of different aspects and the design of the catalogue is quite clean. The system is fast. The presentation of results is clear with images in thumbnail size, snapshot and also possibility to enlarge the format.

> *Best-Practice features*: Catalogue with a simple and advanced version. Search limitation. Result presentation with images in thumbnail size, snapshot and possibilities to enlarge.

Many libraries, archives and museums are currently planning to convert their card catalogues. They could be advised to study the **Digital Image Archive** project undertaken by the Austrian National Library. The main target for the project was to create an efficient model for the Digital Image Archive. The project shows a good example of how you can improve the access to the library collection and also exploit traditional collections based on existing organizational structures. The project has implemented a digital image catalogue from the library’s card catalogue of ca 1.1 million cards. Entries are continuously linked to digitised images, displaying a thumbnail view of the image. The indexing software was programmed in the library and the indexing presents unique features such as geographical area codes and a topographical index. Following political or geographical borders, auxiliary lines were drawn in one atlas and two maps of Austria and the different areas were numbered from 1 to 247. This system allows you to search the files for geographical pictures of specific areas, an interesting feature for a regional project like REGNET. The experience and knowledge coming from this project is an asset to the REGNET project.

The best practices in this domain reveal the necessity of a high cataloguing quality and advanced search features. All listed sites could serve useful hints to the development of enhanced search functionality also based on distributed systems. According to the analyses a search functionality must offer search masks for the simple search as well as for advanced search, have to provide subject access by integrating multilingual thesauri and other thematic classifications schemes. Added value could be provided by well-structured relevance ranking features and possibilities to refine and store searches for later use.

3.2.2 Best practices in the domain Museum

The analysis conducted for the domain Museum comprises 5 applications, which are listed in Table 13.

The **Istituto e Museo di Storia della Scienza di Firenze** is a science museum and library web site which offers a searchable database for the Library and thematic exhibitions in the museum section. It could offer as a good example of a *thematic museum* and shows possibilities of the integration of library and museum collection. Also interesting is the experimentation with WAP services.

> *Best-Practice features*: Integration museum - library. WAP services. Thematic access. Worst practice: no multilingualism, no searchable database in the museum section, weak interactivity.

The **Louvre web site** serves as an example of a web site providing *educational resources* for students and teachers along with an editorial tool that allows to publish individual products. The main focus of the analysis was the educational site of the museum. Another interesting feature is the thematic access and the search functionalities for the huge museum collection with good a quality of texts and tales related to an author.

> *Best-Practice features*: Easy and direct navigation. Big collection. Good quality of text and tales. Interactive tool that allows user to publish his/her own final product. Worst practice: only in French, relatively slow.

The **Metropolitan Museum of Art Museum** portal offers a searchable database, online thematic exhibitions, educational resources and an online store. The main reason for inclusion is the existence of community-based services to improve interactivity and "personalisation", by offering e. g. the possibility to create own galleries and calendars.

> *Best-Practice features*: Easy and direct navigation, big collection. Strong interaction with the user (sense of community). e-Business applications of its store. Worst practices: No online access for physically impaired, only in English.

Name	***URL***	***Provider***
Istituto e Museo di Storia della Scienza di Firenze	http://galileo.imss.firenze.it	Istituto e Museo di Storia della Scienza di Firenze
Louvre	http://www.louvre.edu/	Musée du Louvre
Metropolitan Museum of Art	http://www.metmuseum.org	Metropolitan Museum of Art
Museum of Modern Art	http://www.moma.org/	MOMA
Museo della Scianza e tecnica “Leonardo da Vinci” di Milano	Http://www.museoscienza.org/	Museo della Scianza e tecnica “Leonardo da Vinci” di Milano

Table 13: Analysed sites in the domain Museum

The **Museum of Modern Art** also provides a portal with typical features like online exhibitions, educational resources and online store. Besides the impressive content base outstanding features are the interactive games and the e-Business applications of the store which allows the ordering of real goods and digital objects. A thematic access is provided through topics like architecture and design, drawings, film and video, painting and sculpture, photography, print and illustrated books, a search functionality for the collection is missing.

Best-Practice features: Interactive games, e-Business applications of its store. Worst practice: No search through the collection, only in English.

The web site of the **Museo della Scianza e tecnica "Leonardo da Vinci" di Milano** is again a good example for an interaction between real and virtual museum which offers a virtual navigation with interactive features. Multimedia elements are strongly integrated: The Leonardo collection is realised as a 3D museum, moreover the "Webtalk" technology (by Milan polytechnic) allows walking or flying tour of rooms and cloisters, to operate a number of Leonardo machines, to see other visitors, follow their movements and chat with them and to join a group.

Best-Practice features: Multimedia elements/virtual tours. Multilingual site (Italian, English and French). Agreements with other providers for on-line purchase of related publications.

According to this part of the whole analysis the keys to success for cultural online services are tailored content focusing on the quality and functionality as well as the addressing of specific groups of users. Following the theory of virtual communities corresponding features with a high degree of user participating and involvement could support the user satisfaction and loyalty. It gives an insight in possible personalisation features, the screenshot shows the excellent calendar of the Metmuseum with the possibility to set one's own .

Figure 4: Screenshot of calendar of Metmuseum

Figure 5 lists possible services of cultural organisations in the web whereas not all features actually build the state-of-the-art. Most web sites are still restricted to publishing purposes by presenting the collections, offering thematic access and informing about exhibitions. "Innovative" approaches are related to the enhancement of transactions through the web site (mainly e-Business applications) and the improvement of the communication not only with the provider but also within the community.

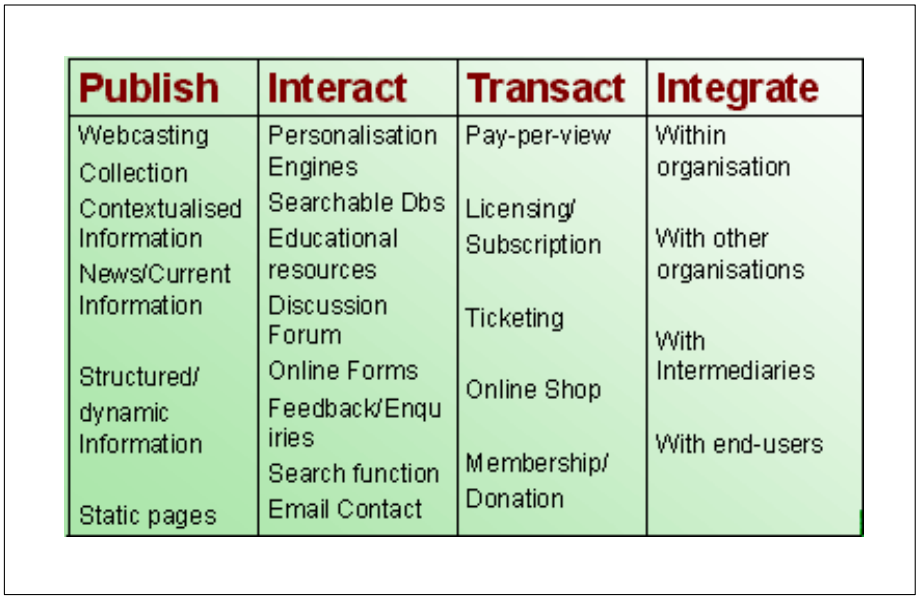


Figure 5: Services of cultural organisations

3.2.3 Best practices in the domain Museum Shops

3.2.3.1 Museum Shops

The number of museum web sites is already vast and the number of museum shops online is quickly rising. Due to the many ways in which one can structure a museum shop it eventually turned out to be impossible to integrate all features used by the larger museum shops into one (understandable) spreadsheet. In this study 56 museum shops were studied of which 7 were dealt with in more depth (Table 14).

Name	***URL***	***Provider***
British Museum Company	http://www.britishmuseum.co.uk	The British Museum
Brooklyn Museum of Art	http://www.bmashop.com	Brooklyn Museum of Art
Louvre Museum Shop	http://www.louvre.fr	Louvre Museum
Metropolitan Museum of Art	http://www.metmuseum.org	Metropolitan Museum of Art
Museumshop.com	http://www.museumshop.com	Museumshop.com
Rijksmuseum Museum Shop	http://www.rijksmuseum.nl	Rijksmuseum Amsterdam
Smithsonian Store.com	http://www.smithsonianstore.com	SmithsonianStore.com

Table 14: Analysed sites in the domain Museum Shops

Best practice feature of the shop of the **British Museum Company** is the visual hierarchical system tree (VHST): this is a partial site map of the categories and subcategories. It is a fast site although the

web site design is not optimal: The background shows too much white to give it a more professional appearance.

Best-Practice features: Visual hierarchical system tree (VHST).

The **Brooklyn Museum of Art** is the best practice example with regard to the web design. Interactive tools enhance the value for visitors, e. g. mail to a friend. All products have also the reduced price for museum members depicted beside the standard price. Not so good is the need to update the basket when the number of the same item has increased or decreased. It is not possible to order from outside the US due to the compulsory data entry in the shipping sheet.

Best-Practice features: Beautiful web design, Mail to a friend, Membership discounts.

The Louvre Museum Shop with 3D pictures, examples of the "product" ("Click here to browse some pages of the book", "Click here to get the original painting", Multimedia: "Click here to get a video sample"). Guided Search and user guide. Apart from the categories on the starting page there is also a (for most part overlapping) division with a more pictorial approach. Order tracking is possible, the payment is possible both by credit card and check. Restrictions: The web site design is not optimal: The background is not filled in on most pages which does not give a professional appearance. The possibility to become a member is hard to find and no advertisements for member benefits are to be found on the site except when checking out. The site is somewhat slow.

Best-Practice features: Browsing by examples. Guided search. Pictorial approach on the starting page. Enhanced payment possibilities.

Metropolitan Museum of Art: Features of relevance are the gift guide, best sellers, track your order, become an affiliate and the suggestion for related items. For several products more than one type is available, e. g. different sizes for rings or T-shirts. All products have beside the standard price also the reduced price for museum members depicted Payment possible both by credit card and check. The start page has too much text and items; it should be more clearly structured.

Best-Practice features: Many value added features like gift guide, best sellers, affiliate programmes.

The starting page of **Museumshop.com** is very well structured, even though it has many functions available. Outstanding are: create a wish list, gift certificate, become an affiliate, search by museum, search by artist, **search** by period, 3D exhibition room, gift finder, bestsellers. For PCs with a slow connection the 3D presentation is not something to enjoy, the site is somewhat slow. Not so good is also the "E-Showcase": after starting this feature and in case of a slow connection it is not clear how to disable the “E-Showcase” view and return to the normal presentation.

Best-Practice features: Also a variety of products and services, search functionalities. Bestseller. Many value added features like gift guide, best sellers, affiliate programmes.

Rijksmuseum Museum Shop: Most sites have the items ordered only by type of product: jewellery, sculpture etc. This site also has the items sorted by theme: e.g. marriage. Depicted by a scrollable picture gallery. Restrictions: The site has a limited number of other features, e.g. customer services, gift ideas, etc.

Best-Practice features: Ordering of items by themes. Presentation modes in the picture gallery.

SmithsonianStore.com Start page is very well structured, even though it has many functions available. Site is fast. Features: Become an affiliate, gift finder, and best sellers: world favourites e-mail this item to a friend.

Best-Practice features: Product portfolio.

All analysed applications offer a variety of features - some of them are outstanding not only for museum shops but also web sites in the cultural heritage sector in general. Besides the claim of an attractive web design the concept of the REGNET shop(s) must incorporate at least the following features which build the state-of-the-art in this domain. The *search and browsing functionality* must include different search options, e. g. a direct search as well as a browsing in predefined categories (e. g. keyword, museum, artist, period, highlights of most popular items). The overall structural categorisation of museum shop items could be presented in a visual hierarchical way as realised at the site of the British Museum Company (Figure 6).

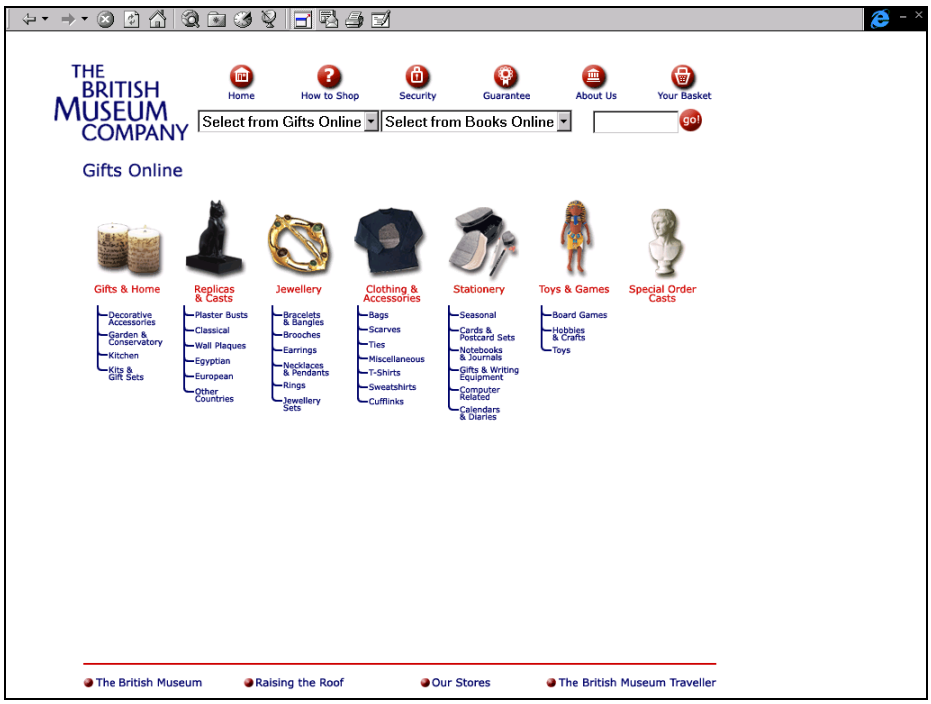


Figure 6: Screenshot of starting page of British Museum Company

The user must be supported not only by comprehensive *help features* (e. g. a user guide) and direct helps for a better orientation but also by *customer services* which facilitate feedback and thus the possibility to optimise the online ordering. Customer services may contain: inquiries & information, "Give us your opinion", track the order. In order to enhance the *orientation* the shop directory must be permanently visible during the whole session.

The *presentation of items* should include not only the normal object information but also in-depth-information if available, e. g. a relation to a story database and the display of related objects must be presented along with the single items. If an item is not available at the moment this information must be displayed and a new supply initiated.

Moreover *special features* like the creation of own wish lists, gift guides and certificates and the forwarding of items (and searches) to a friend and the suggestion of new items could enhance the customer loyalty. Special offers for members like newsletters, corporate gifts and special advantages bound to a membership like discounts build incentives for regular visits and orders.

3.2.3.2 Shopping Carts and checkout interfaces

The analysis of museum shops was completed by a short report about principles of the design of shopping carts and checkout interfaces. This analysis was based on the site of dack.com from which most of the information in this section was taken (http://www.dack.com/web/shopping_cart.html).

Basic elements of shopping carts are: Item number, quantity (in an HTML form box so the quantity can be changed by the user), item description: hyperlinking the item description back to the detail page, item availability, price, currency converter, subtotal, shipping & handling: shipping options, shipment total, a "Remove Item from Cart" option, one "Update Quantities" or "Update Cart" option (update buttons for each item in a shopping cart is not recommended), checkout, continue shopping and search for next item.

An excellent feature that makes e-Business sites more usable and a more comfortable shopping experience is the *persistent shopping cart*. This is a mini-cart that's visible from every page within the site, once an item has been added to the shopping cart. It provides persistent, useful feedback about the items the user has added, and how much money the user has spent (Figure 7).

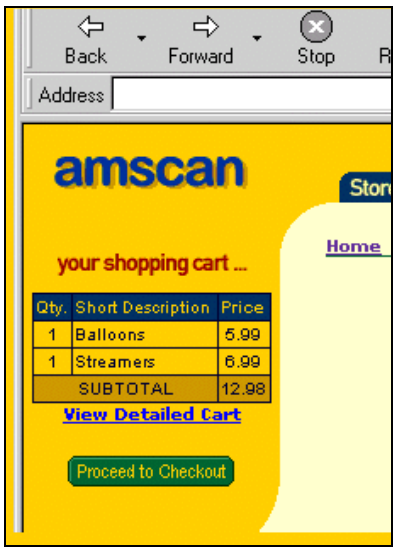


Figure 7: Screenshot of the persistent shopping cart at Dack.com

The elements of a typical *checkout process* are as follows: request e-mail address and password (login), request mailing address and phone number, request ship-to address (if different from the buyer's billing address), request shipping method (e.g. Standard, Second Day, Next Day), request payment method (e.g. Visa, MasterCard, etc. or by check), submit order, order confirmation.

Grouping together on a single, well-designed page is the best practice so that users do not become frustrated with scrolling pages. In fact, several users in their studies did become frustrated with having to click through several short pages in order to get to information. The best way to install user confidence that their order is accurate is to provide them with a complete *order summary* with the option to edit any of the order's elements. A well-designed confirmation page looks a lot like a printed invoice, and should be printer-friendly. This *confirmation page* is a good opportunity for e-retailers to announce a sale or special promotion for its online customers (Figure 8).

Any step in the checkout process that is not directly related to completing the online transaction is a roadblock to completing the transaction, and makes the procedure more complicated, more time consuming, and for many users, more irritating.

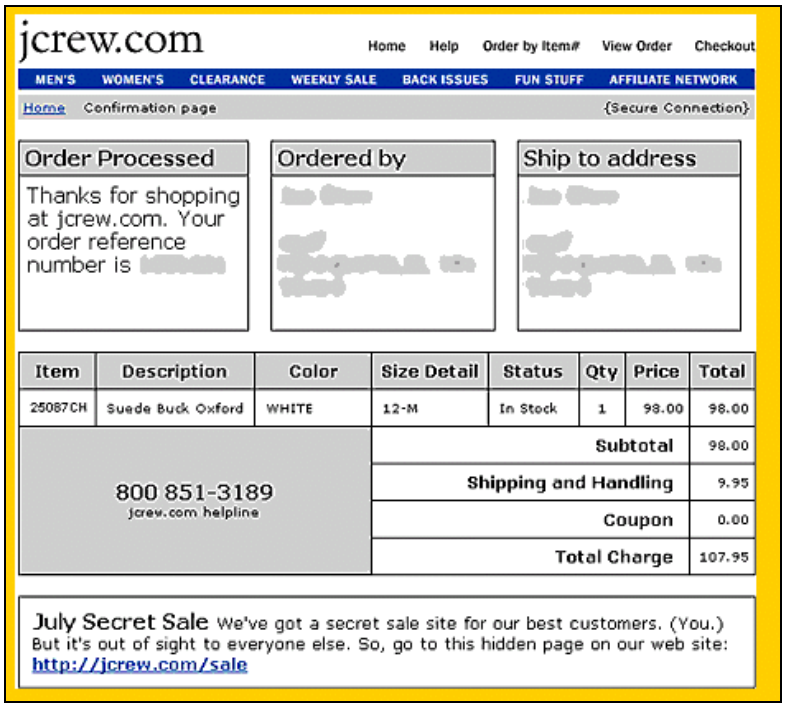


Figure 8: Screenshot of the confirmation page cart at Dack.com

This is the equivalent of queuing at the cashier's desk in the grocery store while being forced to register before buying groceries. Would you buy milk and bread at that store again? Reducing the total number of steps increases the likelihood of user success.

3.2.4 Best practices in the domain Picture Archives

The analysis conducted for the domain Picture Archives comprises 6 applications which are listed in Table 15.

Name	*URL*	*Provider*
Bildarchiv zur Kunst und Fotografie in Deutschland	http://bildindex.de	Universität Marburg
f1 online	http://f1online.de/	f1 online Gorgus und Partner
National Archives and Records Administration / NAIL	http://www.nara.gov/nara/nail.html http://www.nara.gov/research/jfk/jfk_search.html	National Archives and Records Administration (NARA)
Corbis	http://www.corbis.com/	
Bridgeman	http://www.bridgeman.co.uk/	**Bridgeman Art Library**
Scala	http://www.scala.firenze.it/	Scala Art Library

Table 15: Analysed sites in the domain Picture Archives

The **Bildarchiv zur Kunst und Fotografie in Deutschland** is a gateway to archive material including a searchable database (work of arts), photo archive and a virtual gallery of German places (buildings, monuments). The photo archive is structured according to place names (referring to German places) in alphabetical order. The archive material (which is not in the database) is also relatively easy to search with a minimum of effort, as the data structure is easily understood by any user. This feature is matched by the high speed with which the photographs / thumbnails are displayed. The database is also very fast and contains many search options. Search is possible via general search fields and other, more detailed search fields, all containing indexes and an "and/or" option. The quality of the pictures which can be viewed is comparatively high (500x 600 pixels in the database, 1120x1400 pixels in the photo archive.

> *Best-Practice features*: Easy and well-designed data structure. Many search options and fast databases. High quality of pictures. Worst Practices: No light box, pictures have to be ordered individually. Searches can not be saved for later viewing. No download possibilities yet. No online payment (via credit card, pay-safe-card etc.). No value added services.

f1 online is a photo agency which was founded 1996 by 4 photographers. Meanwhile it markets material (about 30.000 exclusively digital pictures) of more than a hundred photographers. The web application consists of searchable database and exhibitions presenting the work of a photographer (may be thematic as well). The site is outstanding due to their *excellent search features* which built the best practice in this domain: keyword search as well as search via theme list, three search fields (in the German version) combined with Boolean operators and picture types (photographs/illustration, themes, formats, colour and/or b/w).. Chosen set of pictures is always visible, good set of thumbnails display options is offered. Registered users have an extended access: enlarged views of thumbnails (260x400 pixels), submission of prices, online order, search saves and free manpowered search service. Pictures are delivered via ftp, E-mail, ISDN, CD-ROM, Leonardo. Direct download in 300dpi possible.

> *Best-Practice features*: Search and display options with enhanced access for registered users. Offering of different download possibilities.

The National Archives and Records Administration is an independent (US-) Federal agency. Its web-site provides access to a variety of web databases: The NARA Archival Information Locator (NAIL) for searching a wide range of NARA's holdings. At the moment it is still a working prototype for a future online catalogue of holdings in Washington, DC, the regional records services facilities, and the presidential libraries. It's divided in Archival holdings and Microfilm Publications. Other databases are JFK Assassination Records, Federal Register (Laws, Regulations, Presidential papers, other Fed.Red. Publications), -NARA Library Catalogue . Other interesting applications are the Exhibit Hall (wide range of thematic exhibitions) and the "Digital Classroom" with electronic workshops, information on summer institutes for educators and opportunities for collaboration with NARA's education program.

Best-Practice features: Best coverage of a great range of different object types; functional search masks, fast database, good picture quality (enlarged thumbnail up to 600x600 pixel), big amount of information. Worst practices: Search results display is only linked to thumbnail display (no gallery viewing).

Corbis' main offices are in Seattle, Hong Kong, New York, London, Los Angeles, Paris and Kuala Lumpur, the privately owned company (Microsoft) has approximately 1,300 employees worldwide. The Corbis Collection includes significant photography and fine art from more than 3000 creative sources, including Ansel Adams, Annie Griffith Belt, David Muench, Roger Ressmeyer, Galen Rowell, David and Peter Turnley, Mark Seliger, The National Gallery - London, The State Hermitage Museum - St. Petersburg, Lynn Goldsmith, Morton Beebe, Nick Kelsh and Chuck O'Rear. Interesting features of the site are the shopping section also with gift ideas, account management and creation of own portfolios and the licensing section to licence photography for advertising, news, editorials and other professional use.

Best-Practice features: Comprehensive information for partners. The users can send their images to the archive after compiling a submission module. New partners can join the archive submitting a specific module. Press releases page gives an update overview on what had been written on newspapers and publications. Easy menu by subject. Possibility to enlarge the thumbnail. Good graphical presentation. Good basket for ideas (downloading images for power point; screen saver images; …). Fast loading for images. Worst practices are the inconsistent subject structuring, low differentiation of images (in the set "boxing" you can find 10 images representing boxing gloves on a total of 26 images found).

The Bridgeman Art Library (founded in 1972) collects art images for reproduction: 800 museums, galleries, private collections and artists. Almost 3,000 Bridgeman images are available for purchase at a site created by stock agency Getty Images. Some Bridgeman's sources are the British Library, the National Galleries of Scotland, Sweden and South Africa, the National Galleries of France and Italy. Offices are located in London, New York and Paris.

Best-Practice features: The database is available to all unregistered users without logging in. Good graphical presentation. Text-only option (fast way to get information). Registering of user search criteria. Simple architecture. Press releases. Worst practices: Some images are not visible (empty thumbnails), too small thumbnails and the watermark is too large, truncated words give no results by the search engine.

The **Scala Art Library** was founded in 1953 by the historian Roberto Longhi. Scala is an archive of colour reproduction (painting, sculpture, architecture, decorative arts, archaeology, and travel). Italian art makes up the core of the collection, but the Library contains thousands of first-rate works from the rest of Europe, the United States, Russia, the Middle and Far East and Africa.

Best-Practice features: Good possibilities to search: full-text searches, free text inquiries in three catalogues (Art, Travel, Art Resource). Advanced searches, available to registered users, for more than one type of inquiry in each of the three catalogues (Art, Travel, Art Resource), producing larger images and allowing the user to select and order subjects on line. Sorting functionality by city, location, and title in ascending or descending order. The user can choose the number of images to be visualised. Worst practices: Slow loading of the images. Too small thumbnails for free search (poor editing quality) for the secondary menu.

Necessary requirements of picture archives are good search functionalities and a high picture quality along with differentiated display options. The f1 online could serve as best practice example due to the

excellent - although not well-designed - search options combining different access methods (e. g. keyword search and thematic access) (Figure 9).

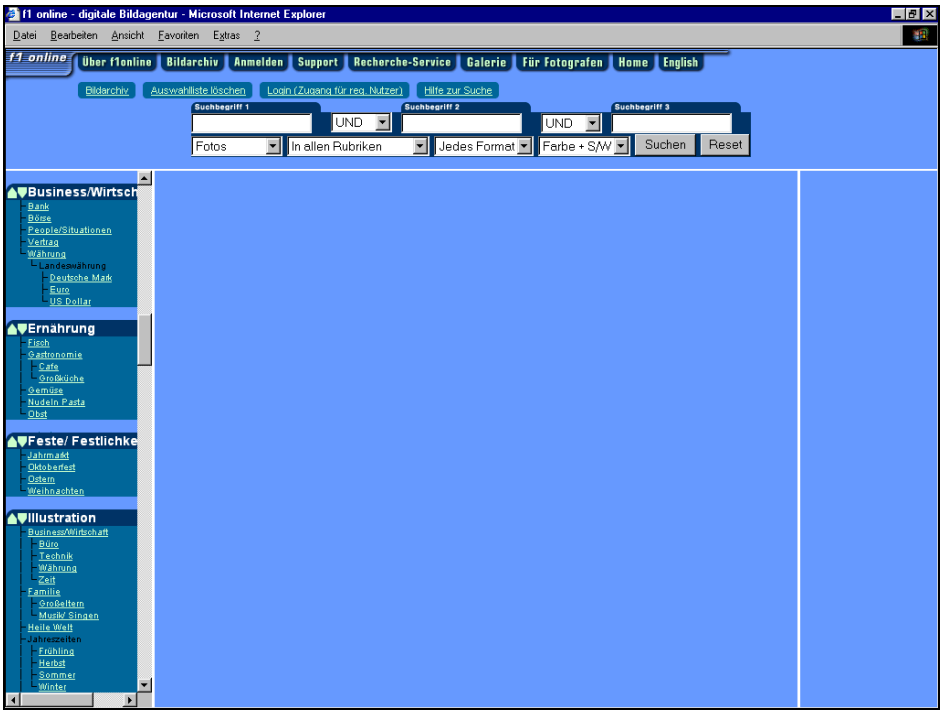


Figure 9: Screenshot of the search page of f1 online

Sites with a commercial background have to provide registration forms and easy login features as well as comprehensive information about the terms of usage and features to assure copyright issues. A good approach for protection was developed by Alinari called "watermarking-on-the-fly". This concept could and should be evaluated with regard to possible adoptions during the software development process. Due to the fact that Alinari is in the project consortium a direct exchange of know-how in this field is assured.

3.2.5 Best practices in the domain Artists/Art Galleries

The analysis conducted for the domain Picture Archives comprises 5 applications which are listed in Table 16.

Name	***URL***	***Provider***
AskArt	http://askart.com	AskArt.com
Workingwith artists	http://www.workingwithartists.co.uk	Workingwithartists
Art Gallery online	http://www.art-gallery-online.org	Art Gallery online
Artcnet.com Fine Art Gallery	http://www.online-artgallery.com	Artcnet.com
Christie's	http://www.christies.com	Christie's

Table 16: Analysed sites in the domain Picture Archives

AskArt offers extensive information of 25000 American Artists on their web site and builds thereby the world's most comprehensive database about American artists.

Best-Practice features: Elegant and compact design with rich information in only one page. General Information, Directories, Searching. Fast searching in a database of American artists by first name and last name. Good help file and a sample in the main page.

Workingwithartists was formed in 1976; the vision is to help build communities by developing creative partnerships between business and the arts. Over 350 business members support the organisation and the many schemes it runs. Membership benefits include advice/information; reference materials on sponsorship, taxation and best practice, priority access to A&B research and invitations to a comprehensive programme of events, seminars and conferences. Features of the site are Arts and Business, Consultants, Funding, Support, Artists Services, Commissioning, Purchasing, Internet Galleries, Internet Investments.

Best-Practice features: Working with artists is an example of site helping the artists in their business. It is fast and well designed. The site is designed specially for business with artists. Worst practices: Only for business use, without collections of artworks/galleries.

The **Art Gallery online** is a newly launched virtual art gallery, striving to be a dynamic art centre and resource for anyone who wishes to gain insight into a variety of styles, ranging from contemporary abstract to photographic realism. Art works could be browsed in a gallery; actual works and artists are featured in an own section. Artists are supported by different consultancy services.

Best-Practice features: Easy and direct navigation. Interaction with the user: user corner with advices to the artists.

Artcnet.com has been founded as an American and international community of award winning artists and artisans who exhibit their artworks on the ARTcnet.com Fine Art Gallery Web site, providing collectors the opportunity to purchase these artworks from the comfort of home. All works are juried. ARTcnet's goals are to act as a cultural bridge among world artists, artisans and collectors; to increase the international reputation of our artists and artisans; to provide an exchange of information, both informally through our forum and more formally through our researched information; and to offer caring service to our collectors, artists, artisans and our world community. ARTcnet.com exhibits almost 1000 unique artworks. The Site has 2 main directories: "Enter Navigation", "Enter Gallery". The Navigation portal consists of Gallery, Associates Program, About ARTcnet, Artists and Artisans, Purchase Policy, Free membership to Club ARTcnet, Bridal Registry, Translate, Search, Auction, Under 500 dollars, Israel Art Tours, Special Events, Publicity, Forums, Privacy Policy. The Gallery Portal consists of: Crafts, Furniture, Painting, Photography, Sculpture, Collectibles Judaica, Artists' Books, Lithography, New Works, Jewelry.

Best-Practice features: Easy and direct navigation. Rich Information with two main directories: Navigation and Galleries. Multilingual support: English, French, German, Italian, Portugal, and Spanish. Worst practices: The Design is not very good. The Interface is not very user-friendly: There is online search, but the Help Menu is not well designed. There is no index Help. You have to know the artist to search his works.

CHRISTIE'S began his work from an auction house in 1766 and has expanded the business to Paris, London, New York and Los Angeles. Christie's has 18 salesrooms world-wide and conducts over 1,000 auctions a year, with the majority held in its London and New York sales rooms. This Company is one of the most famous world players on the Artists' stage with excellent experience. The site has a rich database with many links and opportunities for selling Artist's works, information for auctions with 7 subdirectories about future auctions with online searching dates and places, results, press centre Lot Finder, Web Casts. LotFinder®, Christie's user-friendly online search engine, allows you to view richly illustrated sales catalogues from Christie's auctions around the world.

Best-Practice features: The site has good design, rich information for auctions, very user-friendly interface with explanations, overview and help files for beginners. This site is developed for participating in auctions, receiving information for auctions, information for payment and how to buy, or ordering catalogues for auctions from the 18 auction houses of Christie's.

Again well-designed search functionalities and easy and direct navigation through artists and art works are of outstanding importance for applications in this domain. The multilingual support and options to take part in auctions build the basis for the global business. A good example for supporting artists in their business is the Art Gallery online site (Figure 10).

Figure 10: Screenshot of the starting page of Art Gallery online

3.3 An innovative approach: The HyperMuseum Project

The following information about the Hypermuseum Project as another approach which offers interesting features for the REGNET System was given by the partner CC which was also involved in the Hypermuseum project. Civita is the co-ordinator and promoter of the project. The information is based on a paper presented at the latest A&MI conference held in Seattle last April 2001 and tries to summarise relevant features especially the Theme Generator System (for detailed information see also http://www.archimuse.com/mw2001/papers/stuer/stuer.html).

The HyperMuseum Theme Generator System (TGS) is part of the HyperMuseum system, a European virtual museum portal. Its function is to provide an alternative to the passive use of museum Web sites, which we might characterise as educational browsing, and support a more active type of usage, by letting the user explore and create the objects of study. The main goal of the TGS is to allow the discovery and the realisation of a student's personal theme, based on the materials offered through the HyperMuseum, that can be used for a transient presentation to his peers in the classroom, and that can optionally be further elaborated into a more permanent project for sharing with others. To support this approach, there must be access to the HyperMuseum resources that allows for the discovery of a theme. This is clearly different both from the strict catalogue approach and from the pre-packaged thematic approach. The implementation of the Theme Generator is also intended as an early example of a practical *ontology-based,* or rather, in this case, *ontology-assisted* software tool. Tools of this kind assist the user in the creative process by suggesting (or limiting) choices during the activities of query, search, design or composition of desired results by conceptually (semantically) linking linguistic elements of these activities (query text, figure captions, documentation,...) with other documents and elements through "common" thesauri, lexicons, dictionaries, ... that cover the domain under consideration.

The main approach was to construct a Web of relationships among the different objects in the HyperMuseum. In such a structure, the user could explore the space of relations by browsing this network from point to point, until a theme would emerge as an idea or pattern. At the same time, the user should be able to select the objects encountered for use in the realization of the theme. For finding the possible relationships between the different objects in the HyperMuseum, the project started from the textual metadata that is provided with each of the museum media objects (e.g. physical descriptions, materials, and caption),concentrated on the textual fields in the records. Normalization of the words by using a stemming algorithm (Porter 1980) gives a set of relations to

words for each media-object. Bringing all the objects with their respective word links together in a graph creates a browsable structure, where one can move from object to object through the shared word links.

3.4 Conclusions for the REGNET System

This chapter will summarise the main findings of the Best-Practice Analysis that were considered as state-of-the-art for the surveyed features.

1. Regarding the *access methods* for cultural heritage sites it could be stated that different access methods must be offered. The following are desirable:

- Special access for special information needs:
  - Searchable database(s) / search functionality for direct access
  - Browsing capabilities for selected items / parts of the collections, e.g. special themes, actual exhibitions, special offers, new items, single artists and educational material
- Personal access for personal information needs personalisation features, e.g.
  - Creating of wish lists
  - Gathering of favourite works
- Further access methods
  - Suggestion of related items
  - Guided searches
  - Intelligent navigation system

Portal Services which must be integrated in the REGNET System are consequently search, a virtual gallery and a digital classroom. The user must get access to personal areas and individual services by logging on. Different navigation tools allow additional access.

2. The results of the analysis of *user functions* could be concluded by claiming the following minimum services:

- Search for objects
- Picture preview
- Order objects/direct sale/e-Business
- Online-help, „FAQ“
- Information about general terms of trade
- Contact forms (e.g. request for information, technical problems, complaints, etc.)

3. The third group of requirements is related to individual features (services) relevant to and differing by the different domains:

- Search
  - Differentiation between browsing and direct search
  - Differentiation between simple and advanced search
  - Search modes: index search, combined field search, full search
  - Search functionalities: Boolean operators (and, or), truncations
  - Specials: save searches for later viewing, guided searches
- Display options
  - Objects are presented by thumbnails/enlarged view

- Differentiation between brief information/full information
- Advanced display option: present samples (e.g. pages of the book, video)

- Ordering
  - State-of-the-art: Mail order form
  - Online payment is highly desirable
  - Payments should be possible both by credit card and cheque, and ...
- Delivery of objects
  - State-of-the-art: FTP, E-mail, ISDN
  - Special: Delivery by CD-ROM, direct download
- Value added services, e.g.
  - Search saves
  - Online ordering
  - Personalisation features
  - Community services (forum)
  - Search service
  - Newsletter
  - GPRS services
  - Interactive tools for publishing
  - Value added services for members (discounts, electronic postcards, own homepages ...)

The fourth subdivision examined the methods of object presentation currently in practice in the different domains e.g. which object information is given, which data fields are used, how the objects are classified. Features applying in general concerning this question were:

- Integration of different object types
- Merging of different content providers
- Differentiation between object information and bibliographic information
- No unique (subject) classification scheme (keywords, classification, thesauri, product classification)

Regarding the different access and cost models last but not least the following conclusions could be drawn for the REGNET System:

- Distinction between free and restricted services
- Value added services for registered users

4 Use Cases and User Requirements

4.1 Typical use situations

The main use cases for the cultural heritage sectors (represented by the domains covered in the project) were generated and discussed at the REGNET meeting in Stockholm on June, 12. This work should complete the already conducted analysis of use situations in the audit. All use cases worked out by the content group are listed in the next chapter. When defining the primary use cases, it is not needed to capture "every detail of the use cases". Thus, use cases are used primarily to capture the high level user-functional requirements of a system. Keeping this definition in mind, we design our

use-case-model as a first outline of features to be supported by the REGNET System (as a kind of wish list).

All use cases are prioritised according to the following scheme:

0 Not Relevant (in this phase)

1 Must

2 Should

3 Desirable

The priority is split into first phase (REGNET prototype) and second phase. In order to explain and illustrate possible ways to realise the underlying features and functions are already derived. References according to the best practice analysis are given.

The use cases are grouped according to the functional groups of the technical partners. A cross-reference between the different use cases was made by them so that both documents could and should not be seen independent from each other.

4.1.1 General Functions (G0)

Note: Some of the "needs" in terms of use cases result in horizontal features like profiling/personalisation features. They are listed in this section but must be designed to be adaptable for all possible sub-functions etc. Example: "the user wants to have push services" (e. g. a newsletter or a monitoring service). The REGNET System must support this for all kinds of objects, information etc. (e. g. exhibitions, new items in the shop, special offers etc.)

Use Case	Feature	Domain/Different.	Best-Practice	Priority
UC 1 Enter system				
UC 1.1 Login (Goal: use of personalized features, simplification of ordering process etc.)	Login feature (on every side, initiated after attempting to access a service that requires authentication) with validation features, status control and information. - Login as member - Login as group member or - "Individual" user (private) - Login as guest user (limited access)	All user groups and domains (end user, new partners). A differentiation of different user groups is needed (internal user groups, external user groups)	Classification/Structuring: Differentiation of the casual user, registered users and information about registration: Access to account information after registration: Elise http://nile.dmu.ac.uk/elise/el_demo_screens/new_grey/demo.htm (see also UC 4) Concept/Design: Promotion of advantages of membership on each side, registration forms: http://www.metmuseum.org/member/index.htm	1st phase: 1 (possibility to register, information about usage of data etc.)
UC 1.2 Register	- Registration forms for new users - Information about registration process (usage of date etc.) - Status control and information	All user groups and domains (end user, new partners)	Features/Options: Registration form for new users (step-by-step on several pages): https://www.bmashop.com/asp/UserRegistration/register.asp [also design]: http://www.christies.com/ http://www.christies.com/clientservices/terms_conditions.asp	
UC 1.3 Help on Login/Registration	- Information service for registration process (usage of data etc.) - "I forgot my password"-features	All user groups and domains	Features/Options: I forget my-password-features http://ww.metmuseum.org (and many others)	

Use Case	Feature	Domain/Different.	Best-Practice	Priority
UC 2 Display of available functions	In general: User wants to choose between free accessible information and information which is only available by micro payment or by subscription. - Display features/"context" menus dependant on group membership, personal access rights, user profiles - Different starting sites (URLs) to differentiate roles and groups (educational/business/scientific partner etc.). Different entry points	Not all services should require a registration (e. g. information services, search, display of search results)		1st phase: 1 (dependent on registration feature) 2nd phase: 1 (design of entry points for different groups & roles)
UC 3 Select & Switch Language	- Multilingual Interface - Language selection (on all pages)	All users, all domains.	Functionality/Options: Multilingual site with (very) simple "switching" possibilities: http://www.museoscienza.org (in frame, switching must be improved for REGNET)	1st phase: 2 (start with one language)
UC 4 Account & Profile Management	Account management for administrators: - Create users/accounts, view user information, edit user information - Search for users, select user information - Administration of user/user groups (e. g. definition of new groups, grouping functionality) Account management for users: - View, edit account information - Create & Edit Profile (e. g. search) Enhanced Personalisation features & Services (see also G3)	Different levels have to be distinguished: For Administrators (must be defined) For Content Provider to edit their own users For all registered users (end users)	See also UC 1.1 Classification/Structuring: Good hints (deriving of sub-functions, design of menu) for the account management feature: general settings, search settings, invoice history etc.: http://nile.dmu.ac.uk/elise/el_demo_screens/new_grey/demo.htm	1st phase: 1 (create & edit own profile) simple account management features 2nd phase: 1 (enhanced features, e. g. push services, specified profiling)

Use Case	Feature	Domain/Different.	Best-Practice	Priority
UC 5 Feedback	- Feedback forms/email functions - Forum/Boards	All users (customers/members). Possible as "general" feedback and "specialised" feedback available in different use situations.	http://shop.louvre.fr/EN/avis.asp http://www.askart.com/	1st phase: 0 2nd phase: 1
UC 5.1 Make suggestions				
UC 5.2 Make complaints				
UC 5.3 Direct contact	- Directory of all partners/artists etc. (Kind of address book)			
UC 5.4 Receive feedback	- E-mail accounts/forwarding functions - Admin-Area to manage	All "internal" users, e. g. content providers/sellers etc.		
UC 6 Help	- Help Features (Help Button)/FAQ - Navigation Help/Site Map - Technical Help	All domains, all users. Available as general help (on every page and context-sensitive).	Features/Options: Comprehensive help features (FAQ) in the shop, in general "customer care". Site Map Feature as "special" help function (not design): http://www.art-gallery-online.org/map.shtml	1st phase: 1 (general help/FAQ) 2nd phase: 1 (other help services listed)
UC 6.1 Answer to specific question	- FAQ, E-mail functionality , Telephone, Online Help Desk For context specific help G1 - G3	Different "support" functions		

Use Case	Feature	Domain/Different.	Best-Practice	Priority
UC 7 Request information	- Information and Service area with general information (every page) - Download of necessary agreements, contracts etc. - Contact information - Use of the system/data - Publishing conditions for items, Copyright Information	All domains, all users but: to be specified for the different functions and user groups	See also Customer Care section in e-Business use cases (f. e. Smithsonian Shop): http://f1online.de	[See UC 6:] 1st phase: - general information 2nd phase: 1
UC 8 Download	- Download capabilities for necessary plug-ins etc.	All users		1st phase: 1
UC 9 Leave System	- Logout feature	All users		1st phase: 1

4.1.2 Data generation (G1)

Note: The use cases mentioned in this chapter are on a rather superficial level and must be specified in a generic way (according to the already described and known internal processes in the different domains (Task 1.6) and the existing data structures). It is necessary to bear in mind that the needs in the different domains could be very different and the goal has to be to design a highly adaptable system.

Use Case	Feature	Domain/Different.	Best-Practice	Priority
General Best-Practice Hint: The ELISE project (see Best Practice Analysis) is a good example for a distributed system based on standards such as Z39.50 und Dublin Core.				
"General" data generation use cases (for objects, products, images and background material)				
UC 10 Digitise objects	- Provision of methodology (How-to-Manuals online) etc. - to be worked out in WP 1.2) "Help" - Features to support the process: automatic upload of scanned images (directly after scanning)	Content provider in different domains (according to their rights) Later: Business partners, new content providers	Methodology will be worked out in WP 1.2 on the basis of international best practice.	1st phase: 0 2nd phase: 1
UC 11 Enter (object) data (Enter & Upload)	*Goal*: Professional user wants to catalogue/describe his items/objects/products etc. (for local use, for publishing in the REGNET System, for the generation of products etc.). Note: At a minimum the following cases have to be distinguished: 1. Professional user uses only the REGNET System for data input 2. The user uses REGNET only for "registration" of selected items.			
UC 11.1 Generate (new) data (object information/products, etc.)	- Data input tools "Web administration tools" (Entry component)	Content provider in different domains (according to their rights) - Different categories of items have to be distinguished (with different object presentation schemes) = specific data entry masks	Data generation tools: COVAX project (Walter Koch) http://www.csceurope.org:8080/covax/index.htm Concept: Hints to necessary data fields valuable for picture archives: http://bildindex.de. Classification/Structuring: Great range of different object types: http://www.nara.gov/cgi-bin/starfinder/0?path=standard.txt&id=demo&pass=&OK=OK (Media Type classification)	1st phase: 1 (general data input mask and features, adaptable by content providers)

Use Case	Feature	Domain/Different.	Best-Practice	Priority
UC 11.2 Import/Upload existing data from local systems	- Upload and conversion tools for different data management systems (library system, shop systems etc.)			
UC 11.3 Upload digitised objects	- Tools for uploading of image files (after scanning, see UC 9)	See above	Data generation tools: COVAX project (Walter Koch) http://www.csceurope.org:8080/covax/index.htm	1st phase: 1
UC 11.4 Enter background material (e.g. texts, links, news, exhibitions etc.) (full texts, multimedia files)	- Tools for creation and uploading new or existing texts/files etc. (e. g. press releases, sample (also multimedia files). - Tools for relating background material to existing objects etc.			1st phase: 0 2nd phase: 1
UC 11.5 Enter exhibition information	- Tools for creating & uploading events (Calendar functions) See also G3 Event use cases.	Content provider, especially artist, gallery, museum (according to their rights) Later: Business partners, new content providers		
Note: Some partners stressed the necessity of thesaurus management. It is not listed as an individual use case but must be considered as part of the whole data generation feature, i. e. that it should be necessary as a kind of special collection management feature to admin own thesauri. Priority: 1 (in 1st phase).				

Use Case	Feature	Domain/Different.	Best-Practice	Priority
UC 12 Edit & delete				
UC 12.1 Change (Update & Delete) specific issue/object and product information	- Editing Tools "Web administration tools" (Editing component)	Content provider with domain-specific respectively object specific differentiations/functions (according to their rights) Later: Business partners, new content providers	Data generation & editing tools: COVAX project (Walter Koch) http://www.csceurope.org:8080/covax/index.htm	1st phase: 1
UC 12.2 Change (Update & Delete) multiple issues at once				1st phase: 2
UC 12.3 Change (Update & Delete) other information objects (background information, events etc.)	- Editing Tools "Web administration tools" (Editing component)	Content provider with domain-specific respectively object specific differentiations/functions (according to their rights) Later: Business partners, new content providers		1st phase: 0 2nd phase: 1 (annotations)
UC 12.4 Change (Update & Delete) digitised objects				1st phase: 1

Use Case	Feature	Domain/Different.	Best-Practice	Priority
"Linkage" use cases (these use cases are part of the data entry and editing cases and are parts of the resulting masks and functions) but should be stressed separately.				
UC 13 Relate items to contextual data UC 13.1 Create own storyboards, themes, fragments UC 13.2 Edit and delete existing storyboards, themes, fragments UC 13.3 Further editorial functions (review, versioning) UC 13.4 Upload existing data UC 13.5 Cooperate and suggest on themes	**See thematic approach** As a special function to be included and used as an additional layer/entry point to the data (besides the data structure defined through standards). - Forum - Suggestions tools - Search Tools - Editing Tools	"Full" administrative functionality for content provider in different domains (according to their rights) Limited functionality for end users: search, create storyboards, save information, feedback on themes, subscribe to services	Theme expert: Vic Haesaerts (TARX). "Best practice" example: Hyper museum http://www.hypermuseum.org (The Theme generator system).	1st phase: 1 (basis functions) 2nd phase: 1 (enhanced functions especially for end users, like suggestion of new themes, subscription of theme-based products)
UC 13.6 Cooperate and suggest on themes				
UC 14 Relate different object types to each other	Possibilities to establish links between the different "areas" and different object types of the system (e. g. shop items and real objects, works and related products like books etc.) Perhaps a "function" resulting from data model	"Full" administrative functionality for content provider in different domains (according to their rights)		1st phase: 0 (basis functions) 2nd phase: 1

Use Case	Feature	Domain/Different.	Best-Practice	Priority
Publishing & Export use cases (for objects, images, products etc.)				
UC 15 Integrate items in REGNET System (e. g. objects/works/items)	- Selection and publishing/registration tools for the REGNET portal (all objects, items etc.) - Selection of "areas" where the information should be published (e. g. registration for shop, object database, auctions, other categories)	Content provider (according to their rights) Different categories of items have to be distinguished (with different data structures)	Data generation & editing tools: COVAX project (Walter Koch) http://www.csceurope.org:8080/covax/index.htm	1st phase: 1
UC 16 Highlighting of new entries (e. g. objects, events, artists)	Automatically provided by the system - Selection of new items on different presentation levels (objects, artists, partners, products etc.). *Goal*: Object presentation in special areas of the portal and / or selection for newsletter and other services (automatically) (see also G3)	Content provider (according to their rights)		1st phase: 1 (automatic selection and presentation in category: "New in REGNET")
UC17 Select highlights from the collection	- Selection tool for items meeting the specific criteria (which could be defined by professionals for its collection). *Goal*: Object presentation in specific areas of the portal and/or selection for newsletter and other services (automatically) (see also G3)	Professional users (according to their rights)		1st phase: 2 (simple marking of items and/or definition as theme)

Use Case	Feature	Domain/Different.	Best-Practice	Priority
UC 18 Use the data of the REGNET System for the usage outside the system	- Export functions - Conversion tools - Publishing tools Quality assurance editorial board.	Professional users (according to their rights)		
UC 18.1 Create own web site	Web Publishing Tools, - e.g. semi-automatic creation of sub-collections for publishing on own web site (e-Business-service?) - e.g. value-added services for the creation of new pages ("partner service")	"On demand", restricted to member groups		1st phase: 0 2nd phase: 2
UC 18.2 Use of selected parts in local kiosks	- Export functions and publishing tools	"On demand", possible for all content providers		
UC 19 Print-out	Printer-friendly version of the system. (See also reporting U22 ff.)	All content providers but: with very different needs and goals		1st phase: 1
UC 20 Generate (new) products	See e-Business use cases (G3)			

Use Case	Feature	Domain/Different.	Best-Practice	Priority
Data generation use cases in order to describe the institution and collection				
UC 21 Provide information about collection & institution		Content provider in different domains Later: Business partners, new content providers		[For all use cases of UC 21]: In 1st phase: 2 provision of basis partner information (without editing etc.), see UC 7
UC 21.1 Integration of existing web site	- Tools for the generation of collection and institution profiles - Tools for editing and deleting data - Tools for publishing data in different areas of the portal (partner area) Also an "administrative" function (G0)	Content provider in different domains Later: Business partners, new content providers		[For UC 21.1]: 1st phase: 0 2nd phase: 1
UC 21.2 Creation of information about collection				1st phase: 0 2nd phase: 1
UC 21.3 Creation of information about institution				
UC 21.4 Linkage to other collections /institutions				1st phase: 0 2nd phase: 2

Use Case	Feature	Domain/Different.	Best-Practice	Priority
Reporting Use Cases				
UC 22 Reporting	Administrative Use Cases. The main goal is to report the usage of the REGNET System in general and the possibility to report usage of single collections and objects, products in shops etc. - Tools for reporting the usage of the system, Automatic Click stream analysis (how users use the system, the objects, collections. Which paths are used etc.) - Special functions for stock management (see e-Business G3) Examples of reports: Collection usage, shopping activities (e.g. monthly sales)	All professional users (content) providers in different domains, with individual requirements. Available for each provider/partner and the general REGNET administration.		1st phase: 0 2nd phase: 1
UC 22.1 Generate Reports	See general use case UC 22	See general use case UC 22		1st phase: 0 2nd phase: 2
UC 22.2 View, print & save predefined reports				
UC 22.3 Create own report (My Report)				
UC 22.4 Print & Save an own report				
UC 22.5 Change a predefined report				

Use Case	Feature	Domain/Different.	Best-Practice	Priority
Special collection management				
Remark: this list has to be completed by special collection management features for the different domains. They are not integrated in this version but first promises were made in IR 1.6. The special collection management use cases (e. g. acquiring, borrowing objects in libraries and museums) could be defined with the help of the content providers. IMAC distributed a list of experts to VAL.				
[as part of UC 11] Define and edit own thesauri	- Thesaurus management features	Professional users for their specific collections		1st phase: 1

4.1.3 Search System (G2)

In this section the basic search use cases should be listed. The main search use cases are search, brows (results), save and assist. Additional functions like alerting (by e-mail or web-based alert functions) could be interpreted as "services" (G3) but should be listed in this section in order to give a comprehensive overview about necessary search features (a link to the related group is integrated).

Use Case	Feature	Domain/Different.	Best-Practice	Priority
UC 23 Search items	*General Remarks*: Presentation of predefined options without selection through user (e. g. search field on every page), presentation according to profile/actual session information and explicit link to search mask(s).			

Use Case	Feature	Domain/Different.	Best-Practice	Priority
U23.1 Search by criteria (direct search)	- Different search modes: - Index search (e. g. thesauri search) - Full-text search - Metadata search (field search) e. g. search by artist name etc. (dependant on data structures for different domains and databases) - Usage of Boolean search operators to combine criteria and truncations - Selection of collections/data bases to search in (shop search, object search, collection search etc.) - Overall search for all collections and data bases	Different search masks for different - levels of expertise (simple, advanced) - different databases (shop, objects) - different user groups (intern, extern) according to their rights)	Features/Options/Design: Excellent search mask (advanced) with index search for themes etc., free text search, checkboxes for selection of object types (!), nice design. Design of index/thesaurus search (new window, graphical approach), used thesauri, context sensitive help (see also UC28). http://sematos.valoris.com/RDCE/RMN_A/pageA_recherche/Recherche_A.htm# Good example for simple and advanced search mask, thesaurus and index search (browsing) http://nile.dmu.ac.uk/elise/el_demo_screens/new_grey/demo.htm Excellent search features: keyword search as well as search via theme list and combined field search. Left-hand truncation. Theme-based search approach, selection of search options: http://f1online.de Kind of theme-based access, http://www.rijksmuseum.nl (also UC U31.1) Possible data fields and good index search (not design): http://bildindex.de Nice approach for index search (design) and selection of search http://search.sothebys.com/search/quickSearch/k2/advSearch.html Classification/Structuring: Search for different object/media type: http://www.libris.kb.se.	1st phase: 1

Use Case	Feature	Domain/Different.	Best-Practice	Priority
UC 23.2 Browse/ Navigate through predefined categories	- Navigation tools (e.g. menu on start page) with: - Predefined access points, e. g. product categories in the shop, themes, new items, highlights (see also G3)	Different entry points for different user groups	Classification/Structuring/Design: First page navigation with news, highlights etc.: www.metmuseum.org Good example for navigation tools e. g. for thematic access to be integrated on each side for easy and quick access: http://www.museoscienza.org, also: http://www.britishmuseum.co.uk/frameset.htm (in the shop). See also UC31.1: where the British Museum is listed because of their visual hierarchical navigation system in the shop - a tool which could be used also for general search and navigation. Art forms: http://www.aobfineart.com/ Design: Graphic presentation of collection subjects, Virtual tours (3D) through collections. http://www.louvre.fr/louvrea.htm . Nice feature to explore news, actual exhibitions (starting page): http://www.rijksmuseum.nl/asp/start.asp?language=de Thumbnail gallery of artists: http://www.art-gallery-online.org/gallery/gallery70.shtml	1st phase: 1 2nd phase: 1 (differentiation of entry points for user groups)

Use Case	Feature	Domain/Different.	Best-Practice	Priority
UC 23.3 Use own selection(s) as entry points (after login/authorisation)	- My Search Mask - Own selections (e. g. browse through bookmarks), saved searches and records. My Bookmarks (as part of personal work space) Accessible through user account, to be administrated (edit, delete, update) through account management functions (see G0, UC 4)	All registered users		1st phase: 0 2nd phase: 1
UC 24 View results (browse)	- Generate result list (short information, e.g. title, year, price) - Integration of graphic symbols in order to mark different object types (free items, object type, format etc.)	All domains and users, different options for professional and end user, esp. enhanced features for profession Different "default" display fields for different users and object types (dependent on the database searched in)		1st phase: 1 (simple result list) 2nd phase: 1 (graphic version)
UC 24.1 Browse results	- Scrolling functions: selection of number of result page, up, down, start of the list, end of the list			1st phase: 1

Use Case	Feature	Domain/Different.	Best-Practice	Priority
UC 24.2 Sort results	- Selection of different sorting criteria in order to change the default sort order	Different search options for professionals and end users	Features/Options: Enhanced redefine options and selection of sorting criteria: http://search.sothebys.com/search/quickSearch/k2/advSearch.html	1st phase: 2 (definition of some sorting criteria) 2nd phase: 1 (enhanced features for professionals)
UC 24.3 Change default display options	- Selection of display modes/fields to be displayed in short list		Features/Options: Selection of different display options (pull-down-menu): http://f1online.de/. Selection of number of items to be displayed on one page: http://www.nara.gov/cgi-bin/starfinder/2863/standard.txt Design: Selection of different display options: http://search.sothebys.com/search/quickSearch/k2/advSearch.html	1st phase: 2 2nd phase: 1

Use Case	Feature	Domain/Different.	Best-Practice	Priority
UC 24.4 Select items for further "use"	- Selection tools for further use (next U 25) - Features to create (and later edit, delete and send) personal selections (search specific, part of the My Search selection, see) Accessible through user account, to be administrated (edit, delete, update) through account management (see G0, UC 4)		Features/Options: Selection of items for further use and display of selected items in separated frame. Status information, deletion of selection list is possible: http://f1online.de	1st phase: 0 2nd phase: 1
UC 25 Use record	Goal: See further information about the object (not the object itself - this is part of e-Business use cases).			
UC 25.1 View detailed information	- Display function for bibliographic information - Display functions for origin of the objects and "holdings" (locations) - Display functions for access information (part of e-Business)	All user groups. Display of certain fields & formats according to user (group) rights.		1st phase: 1
UC 25.2 Change default display options (for records)	- Selection of display modes/fields to be displayed in full record display	All user groups. Display of certain fields & formats according to user (group) rights.		1st phase: 2 (selection of 2-3 display formats, predefined) 2nd phase: 1

Use Case	Feature	Domain/Different.	Best-Practice	Priority
UC 25.3 View contextual information	- Linkage between objects (see also data generation UC 13)		Features/Options/Design: One approach (realised in the shop) to present objects and related items as well as background information (explore the history): http://www.bmashop.com/asp/browse/productdetails.asp?CategoryId=169&ProductID=1223	1st phase: 1
UC 25.4 Step through related issues	- Linkage between objects (see also data generation)		Features/Options: Suggestion of related items: (e. g. from exhibitions to shop items) in order to related different databases/object types: www.metmuseum.org (after any selection/search in the frame on the left side) BMA shop, see above	1st phase: 0 2nd phase: 1
UC 25.5 Search for related objects	- Besides the linking functionality perhaps a kind of “search-by-example” functionality respectively. The possibility to start search by an already known record.			1st phase: 0 2nd phase: 1
UC 25.6 Store records	- Own selections (e. g. browse through bookmarks), saved searches and records. My Bookmarks. See U23.3 Accessible through user account, to be administrated (edit, delete, update) through account management functions (see G0, UC4)	For all registered users (login required)		1st phase: 0 2nd phase: 1
UC 25.7 Send item information	- E-mail functionality to send objects/records, texts etc. to other users (also external users not part of the REGNET System)	For all registered users (login required)	E-mail to friend, e. g. http://www.bmashop.com/asp/browse/productdetails.asp?CategoryId=162&ProductID=1298 mail to a friend	1st phase: 0 2nd phase: 2

Use Case	Feature	Domain/Different.	Best-Practice	Priority
UC 26 Store query	- Own selections (e. g. browse through bookmarks), saved searches and records. My Bookmarks. See U 23.3	For all registered users (login required)		1st phase: 0 2nd phase: 1
U26.1 Store query				
U26.2 Edit stored query				
U26.3 Rerun stored query	- Automatic rerun of searches and alert/push functionality to inform users about new items which match h the (originally) query.			1st phase: 0 2nd phase: 2
U26.4 View search history	- Storage and display functions for searches performed (limited e. g. to the last 10 searches)	Could be a function offered not only for registered users but also as an automatic process on the basis of cookies etc.	See AltaVista Germany http://www.altavista.de: Storage of the last 25 searches “Search tracker”	1st phase: 0 2nd phase: 1
UC 27 Redefine query	- Enhanced search functionality to change the originally retrieved search results	For all user groups	Features/Options: Redefine search: http://www.nara.gov/cgi-bin/starfinder/2863/standard.txt Enhanced redefine options and selection of sorting criteria: http://search.sothebys.com/search/quickSearch/k2/advSearch.html	1st phase: 3 2nd phase: 2

Use Case	Feature	Domain/Different.	Best-Practice	Priority
UC 28 Assist search	- Different Help features: -General search help -Context-specific help -Search FAQ - Ask an expert feature (online) - Search service as part of the REGNET business model (also G3)	For all users, dependent on requesting situation.	Features/Options/Design: Guided Searches as an attempt of assist the search (e.g. in the shop): http://shop.louvre.fr Good approach to realize context-sensitive help and enhanced assistance features like "search examples" http://sematos.valoris.com/RDCE/RMN_A/pageA_recherche/Recherche_A.htm# Concept: Search Service: http://f1online.de	1st phase: 2 (short explanation) 2nd phase: 1 (enhanced, context-sensitive) 3 (ask an expert, search services)
UC 29 Personalized Search	See U23.3 ff. Goal: Save, edit, delete and “perform” own search functions. Search profiles			
Transaction use cases when the resources are not free at the point of access. See e-Business use cases. See introductory remarks: there have to be a differentiation between objects and their use which did not require an authorization (and must not be “ordered” due to the fact that they are free) and restricted objects to be paid for. The process of request and access are the same. See e-Business.				

4.1.4 e-Business (G3)

Preceding use cases of this use cases section are login (if necessary), search and locate and request respectively see object details. Some of the use cases are repeated here by strengthening the features necessary to decide if the item should be ordered or not respectively by describing the use cases valid for the presentation of objects for sale.

Use Case	Feature	Domain/Different.	Best-Practice	Priority
Presentation use cases (see also U 25))				
UC 30 Offer items for sale	- Shop systems - Online auctions To Do: Set up of product categories and "micro-shops" in different areas for different user groups. Integration of shops, products of other business partners (B2B).	Professional users (e.g. shop keeper), provider, business partners	Concept/Service: Ordering of gift certificates: www.museumshop.com Online auctions: http://www.sothebys.com, http://www.christies.com/ (both essential features of auction systems), http://www.phillips-auctions.com/home.html, http://www.skinnerinc.com	1st phase: 1 (see beneath)
UC 30.1 Generate items for sale (manage shop catalogue)	- Input features for objects, related works, products etc. (also assignment to product categories). Tools for editing and deleting objects - Managing of “sales-related” information, esp. Prices, terms & conditions, agreements (e. g. for download) - Selection features to publish in different areas of the system (shop, auctions, object database)			1st phase: 1

Use Case	Feature	Domain/Different.	Best-Practice	Priority
UC 30.2 Make special offers	- Tools for the input/selection of products to be offered as special offers e.g. for a time span or special user groups - Tools for the generation of other special offers like gift guide, highlights, best sellers (also a question of data generation/data input fields, e.g. marking an object as gift) See also: UC 52: Discounts for members (shop).	Professional users (e.g. shop keeper), provider, business partners		1st phase: 2 2nd phase: 1
UC 30.3 Make individual offers	- Contact forms for direct contact customer-content provider (or other interactive tools)	Professional users (e.g. shop keeper), provider Per domain partners "on demand"		1st phase: 0 2nd phase: 1
UC 30.4 Usage of copyright protection system	- Digital watermarking	Professional users (e.g. shop keeper), provider. All partners in the system who integrate objects and products	Fratinelli Alinari http://www.alinari.it/	1st phase: 2 (no online distribution) 2nd phase: 1
UC 30.5 Offer for "non-physical" things (e. g. grants, courses, other resources)	See U 30.1 (adaptable system)			1st phase: 1

Use Case	Feature	Domain/Different.	Best-Practice	Priority
UC 30.6 Register as shop keeper	- Registration form and tools/processes to manage new requests	New partners, professional users		1st phase: 0) 2nd phase: 2
UC 30.7 Create, delete and edit new categories in the shop		All authorised shop keepers/administrators of shops		1st phase: 2 2nd phase: 1
UC 31 Search & View objects for sale		End users, all user groups which could/should order items. "Internal" search and display functions for shop keepers (with different goals)		

Use Case	Feature	Domain/Different.	Best-Practice	Priority
UC 31.1 Browsing categories of the shop	- Own navigation bar/classification for the shop (product classification) - Further special categories to browse, e. g. gift guide, highlight, special orders, new items, most-wanted-items, featured items (director's choice) etc.		Classification/Structuring: [also Design] Browsing by categories or designers, gift ideas: http://www.momastore.org. Enhanced Gift finder: http://www.museumshop.com Formal classification of shop items (special offers, gifts etc.) and product type classification (e.g. sculpture) which could be adapted for REGNET (navigation structure, derivation of services): http://www.britishmuseum.co.uk "Formal categories for the items in the shop: http://www.museumshop.com Subject categories: http://www.sothebys.com Design: Good example for an attempt to present all categories and sub-categories in a visual and hierarchical manner (VHST): http://www.britishmuseum.co.uk/frameset.htm Step-by-step navigation through predefined categories and sub-categories: http://www.smithsonianstore.com/asp/browse/category.asp?CategoryId=241 Featured spotlights: http://www.museumshop.com Featured items on starting page: http://www.christies.com Kind of theme-based access, presented a very attractive way (design): http://www.rijksmuseum.nl (also UC U23.1)	1st phase: 1 special navigation categories: 2

Use Case	Feature	Domain/Different.	Best-Practice	Priority
UC 31.2 Search items in the shop	- Shop-specific search mask and criteria (fields), e. g. price search		*Note*: State-of-the-art is a simple search for full text/keyword searches but no differentiated search options! see e.g. design of simple search: http://www.smithsonianstore.com Exceptions: http://www.museumshop.com: Nice features for search by artists, search by period. http://www.aobfineart.com/: Advanced search for prices and other criteria (artist network). Design: Design of search & display options after initial search: http://www.bmashop.com/ (sort criteria, restrictions) also for UC31.3 and general search (view of results). http://www.britishmuseum.co.uk/frameset.htm	

Use Case	Feature	Domain/Different.	Best-Practice	Priority
UC 31.3 View detailed object information	- Display options for objects in the shop and search results, e. g. thumbnail view, enlarged view, view samples - Special display information: terms and conditions for order item		Design/Features: Presentation of detailed object information, especially related items: http://www.bmashop.com/asp/browse/productdetails.asp?CategoryId=169&ProductID=1223 (see also: UC25.3 (step to related items, see contextual information). Very similar example: http://www.smithsonianstore.com/asp/browse/category.asp?CategoryId=241 Detailed view of objects in the store (description, member price, price, picture) http://www.momostore.org Background Information to items in the shops: samples, reviews, video samples (also for UC 25) http://shop.louvre.fr Concept: Cooperative shop for several museums: search by museum and display of holdings. Access to the individual shops: http://www.musuemshop.com.	

Use Case	Feature	Domain/Different.	Best-Practice	Priority
Educational use cases				
UC 32 Present educational material		Professional user, especially museums	Concept: http://www.louvre.edu/ Example for an educational approach (target groups: students and teachers), especially tools for publishing own products. Classification/Structuring: Good Best Practice Example for presentation and access to educational material with very detailed navigation structure and different approaches. http://www.metmuseum.org. Similar: http://www.moma.org. Good Examples for structuring educational material http://www.moma.org or http://www.museoscienza.org (education).	1st phase: 0 2nd phase: 1
UC 32.1 Present educational material	- Tools for generating, uploading and editing education materials related to the own collection, objects etc.			
UC 32.2 Building of digital classrooms	- Enhanced Features for the building-up of an "educational" community, web-based training features, e.g. digital classrooms with further offers for the user			
e-Business use cases				
	Good example for enhanced shop functionality: http://shop.louvre.fr: Several predefined categories to browse the shop (gifts, theme selection, subject categories), gift search, keyword search, order management (tracking, currency selection), login to manage account etc. Good Design!			

Use Case	Feature	Domain/Different.	Best-Practice	Priority
UC 33 Accept terms and conditions (after requesting)	Goal: Agreement (user selects and accepts terms and conditions, agreement is recorded, also agreement about payment method) - Download functionality for terms and conditions Could also be seen as part of the *ordering* process.	End users, all user groups which could/should order items		1st phase: 1
UC 34 Order item	- Ordering features for all objects in the REGNET System (which are "marked" for sale) Shops (according to the state-of-the-art) - Special: Auctions - Customer Care Features (FAQ, Help desk etc)		Features/Options: Special feature: Add to wish list (for registered users): http://www.museumshop.com "Permanent" Features: display of total amount of actual order e. g. http://www.museumshop.com, http://www.louvre.fr Customer Care section: http://www.smithsonianstore.com/StoreAsp/customercare/default.asp	1st phase: 1
UC 34.1 Add to shopping cart				
UC 34.2 Remove from shopping cart				
UC 34.3 Edit shopping cart				
UC 34.4 Change quantity				
UC 34.5 List all items				
UC 34.6 Change customer data				
UC 34.7 Participate in auctions				
UC 34.8 Get confirmation	- E-mail functionality			

Use Case	Feature	Domain/Different.	Best-Practice	Priority
UC 35 Pay for object	Change between different payment modes/features - Direct/Indirect sale		http://www.louvre.fr/ Louvre Shop (see general comment)	1st phase: 1 2nd phase: 1 (online payment)
UC 36 Access item (see UC 30.4)	- Download - Deliver	All registered users	http://f1online.de/	1st phase: 2 (no online distribution!?) 2nd phase: 1
UC 37 Execute Order	- Features for professional users to manage the ordering process and the stock management (Electronic invoice management). See also UC 40	Professional users, shop keepers		
UC 37.1 Display customer information				1st phase: 1 (general execution) 2nd phase: 1 (online invoice management)
UC 37.2 Prove items in stock				
UC 37.3 Create invoice				
UC 37.4 Print invoice				
UC 38 Track order	- Order tracking features for end users	All user groups able/authorized to order (after login), all customers who ordered items "end user"	http://boutique.louvre.fr/en/accueil.asp	1st phase: 2 2nd phase: 1
UC 38.1 Check order status				
UC 38.2 Browse order history				

Use Case	Feature	Domain/Different.	Best-Practice	Priority
UC 38.3 Browse order history	-			
UC 39 View & Edit account	User wants to see account information (cost exchange rates, currency etc.) User wants to save account information (1 year)	All user groups able/authorized to order (after login)	Louvre Shop (see general comment)	1st phase: 2 2nd phase: 1
UC 40 Stock Management		All shop keepers, management level		
UC 40.1 User management	- Features to administrate the own users, esp. Add, update and delete users and user groups - Tools to evaluate and use customer data			1st phase: 1
UC 40.2 Warning	- Warning features if new copies should be delivered			1st phase: 0 2nd phase: 2

Use Case	Feature	Domain/Different.	Best-Practice	Priority
UC 40.3 Reporting	The shopkeeper needs features to generate reports related to shop transactions (predefined reports, Individual reports). Examples for predefined reports: - Overview of items in stock, Overview of sold items - Total amount of money involved in transactions - Most popular items etc. - Percent of visits that results in orders - Items sold/per category - Number of steps needed to complete an order - Percentage of exchanges or returns of items sold			1st phase: 0 2nd phase: 1
UC 40.4 Store measurements	All measurements must to be stored, followed in time and viewed graphically			1st phase: 0 2nd phase: 3
UC 41 Generate products (e.g. on CD-ROM)	- Publishing Features	All authorised user groups.		1st phase: 2 2nd phase: 1
UC 41 Building up virtual galleries	- Publishing Features in order to present a selection of object in web-based form (virtual gallery, exhibition etc.)	Professional partners in different domains, with different needs	Design: Thumbnail gallery of artists: http://www.art-gallery-online.org/gallery/gallery70.shtml (also belongs to UC 23.2)	

Use Case	Feature	Domain/Different.	Best-Practice	Priority
UC 42 Support artists/galleries/libraries/exhibitions	- Contact Features		Concept: Simple approach: http://www.metmuseum.org (e. g. support of exhibitions)	1st phase: 0 2nd phase: 2
UC 43 Find Business partners	B2B-scenarios	All partners Different business communities are needed according to different business needs	Concept: Establishing of business communities (artists): http://www.workingwithartists.co.uk, http://www.art-gallery-online.org/exchange.shtml	1st phase: 0 2nd phase: 2
UC 43.1 Find promoters	- Publishing (self-presentation) and search features to find promoters for works and secondary products (e. g. labels, poster, T-shirts etc.) - Affiliate Programmes	Professional partners, esp. artists (restricted to members of the business community)	Concept: Affiliate Programme. Comprehensive information about: http://www.smithsonianstore.com/affiliates/default.asp	
UC 43.2 Find further materials, partners etc. needed for the work	- Integration of "external" business partners in order to support B2B-transactions (e. g. other shop keeper) - Search and community services in order to use/participate in business community E. g. Integration of service companies (for digitalisation, promotion etc.), ateliers for artists etc.	Professional partners, esp. artists (restricted to members of the business community)		1st phase: 0 2nd phase: 2

Use Case	Feature	Domain/Different.	Best-Practice	Priority
UC 43.3 Find a job	- Job Announcement Tools/Online Recruitment (see IR 1.6, chapter 2.3.2.2)			1st phase: 0 2nd phase: 3
UC 43.4 Find partners for co-operation	E. g. museums who need partners (other museums etc.) in order to co-operation in the preparation of exhibitions - Search and community services in order to use/participate in business community	Professional partners, esp. museums (restricted to members of the business community)		1st phase: 0 2nd phase: 2
Event use cases (see also IR 1.6 chapter 2.3.1.2)				
UC 44 Event-Management		Professional user in all domains where events are of importance (esp. museums)	Features/Options/Design: Good Best Practice Example for event management (calendar etc.) (end user view) is the Met Museum http://www.metmuseum.org/calendar: personalisation features (My Met Calendar), "send to friend"- and "remind-me-features , subject search and event type search (should be evaluated more detailed for the draft of similar categories in REGNET).	
UC 44.1 Generate, edit and publish events (present event/exhibition)	See also G1 Data generation - Input & Edit features for events (calendar) and related information (e.g. exhibition and guided tours, press material) - Tools for the generation of event-based newsletters (promotion)			1st phase: 0 2nd phase: 1
UC 45 Information about events	- Information about events - Calendar - Newsletter - Print products - Own recommendation of events	End user, authorised user (esp. for recommendation)		1st phase: 0 2nd phase: 1

Use Case	Feature	Domain/Different.	Best-Practice	Priority
UC 46 Reserve guided tours	- Booking forms			1st phase: 0 2nd phase: 2
UC 47 Order tickets	- Online-Shopping features		Concept: Order tickets for guided tours in cooperation with (external) ticket offices/networks. http://www.louvre.fr	
Remarks: The event uses - especially the related e-Business functions like reservation and ticket ordering maybe have to be worked out on a more detailed level. Especially it has to be discussed whether the "local" ticketing should be supported by the REGNET System. Perhaps the recreational use cases of IR 1.6 (chapter 2.3.1.4) have to be assigned to this section too (and to the educational use cases).				
Service use cases				
UC 48 Share expertise	- Community services, like forums, personal homepages, expert database	All users, all domains. Differentiation between internal and external communities (to be defined)		1st phase: 0 2nd phase: 2
UC 48.1 Become member			http://www.tate.org.uk/supporters/membership/default.htm	
UC 48.2 Generate & Edit profile				
UC 49 Push functionalities	- Newsletter Subscribe/Unsubscribe - Personalisation - Newsletter Generation (Editing tools etc.)	All Domains, all users but: special newsletters for special parts, types of information, content provider		1st phase: 0 2nd phase: 1
UC 49.1 Generate Newsletter		Professional user		

Use Case	Feature	Domain/Different.	Best-Practice	Priority
UC 49.2 User Newsletter	-	End user (registered)	Classification/structuring: Subscription to different newsletter http://www.metmuseum.org/guestbook.asp (see also UC 50). Similar: http://www.moma.org (kind of newsletters offered and selection of format)	
UC 50 Personalisation	- My REGNET features: Calendar, To Do List, E-mail-addresses, upload area, orders, subscriptions, definition of areas of interest etc., private workspace - Creation and deletion of profile	All, maybe only for partners in the first phase Almost all functions of the portal must be "able to personalise"	Functionality/Features: (after registration) Different personalisation features for members: My Met Calendar, My Met Gallery, notification services: http://www.metmuseum.org	1st phase: 0 2nd phase: 1
UC 51Sumit & promote site	- Submission/promotion services in order to be included in similar sites	Professional user/Partner		1st phase: 0 2nd phase: 2
UC 52 Become a member	See UC 1.1: Concept for membership with separate functions, features and advantages (e. g. discount on shop items)	Possible for certain user groups	Functionality/Features: Membership concept/ programme: http://www.metmuseum.org/member/index.htm, http://www.museumshop.com Membership form: http://www.ago.net/services/membership Design/Functionality/Features:: Especially in shops discounts, presentation example of membership price: http://www.bmashop.com/asp/browse/category.asp?CategoryId=465	1st phase: 0 2nd phase: 1

Use Case	Feature	Domain/Different.	Best-Practice	Priority
UC 53 Other services (in order to improve community character, customer relationship etc.)	Interactive tools for end users (to be defined), e.g. artist poll, rating systems.	End user	Features/Options: Many good ideas for interactive and community-based services for a portal (directors choice, e-mail to friend): http://www.metmuseum.org E.g. E-mail this item to friend: http://www.bmashop.com/asp/browse/productdetails.asp?CategoryId=164 Voting/Rating as an attempt to increase the user interaction: http://www.art-gallery-online.org/artistoftheweek.shtml (Special: Listing of new members) Message boards for user groups, e. g. artist discussions: http://www.art-gallery-online.org/wwwboard/wwwboard.html	1st phase: 0 2nd phase: 2

4.2 User Requirements

The last part of the audit conducted in WP 1.1 was dedicated to user requirements. These requirements will be listed according to the following grouping: General goals and expectation, general and technical requirements and functional and specific requirements. These requirements are statements given by the content providers in order to describe the desired functionality of the system and they do not claim to be complete.

A. General goals and expectations
1. Enhance access to cultural data - Easy and thematic access to cultural data and services - Retrieve CH data world-wide from a single portal - Easy way to find partner sites/enhance access to own web site - Easy and fast access to a variety of geographically distributed information
2. Business Goals - Use the REGNET portal as a tool to acquire art works - Portal for existing museum shop, wider presentation of our archive, better access to our collection - Establishing contacts to new user groups - Facilitating the goals of the Museum through funds generated by the sales of items through the REGNET portal
3. Dissemination and promoting - Use the REGNET portal for disseminating and purchasing contemporary young artists‘ works
4. Using synergies in participation in (global) network - Network effects (globalisation) by establishing professional communities - Stimulate and exchange services between other (museum)REGNET partners - Better cooperation with other institutions
5. Generating new products - Use the REGNET portal for multimedia productions - Network for the creation of cultural products together with the other partners

Table 17: General expectations on the project

B. General and technical requirements	
1. System Architecture	
Server system : - Emergency systems on PC for „critical uses“. - The application supports multiple processor systems. - The system supports distributed data storage - Suitable scripts and/or programs automatically check and restore the system consistency in user-defined intervals. - Sound back-up strategies. - Tools for statistic Analysis (System utilization, logged in users, simultaneous users, etc.)?	 MUST SHOULD SHOULD SHOULD SHOULD SHOULD
The cataloguing and administrative data is available via SQL for further processing (query, data exchange).	MUST
The system supports a plurality of variably tuned and parameterised data banks (catalogues).	MUST
A plurality of differently parameterised teleworking stations is possible.	MUST
The software is automatically distributed on the clients' equipment.	SHOULD
Systems should be easy to handle also for none-experienced persons	MUST
The REGNET server must be immediately reachable from and by all major search engines	MUST
Use of TCP/IP as network protocol	MUST
Software must be based on a Server/Client-architecture, platform-independent and scalable	MUST
2. System Requirements	
Minimum System Requirements	To be specified by technical group
Recommended System	
3. Standards/Interfaces	
Standards for data formats (import and export) - MARC/MARC 21 - Dublin Core Metadata Set (for description of electronic resources) - XML - Z39.50 protocol	State-of-the Art for Libraries! SHOULD
An automated transfer tool should be available to adjust format of the images from the Image-Data base into formats directly to be used for web publication (72 dpi) or WAP, etc.	
Define a standard format for the images, preferably 300 dpi	
Support of HSM (Hierarchical Storage Management) for high-resolution-images)	SHOULD
4. User Interface	
Window technology according to state-of-the-art GUI-standards is used in all modules.	MUST

Database and server-software (application) works on all UNIX-systems in use, especially SUN-Solaris	MUST
The system supports a plurality of variably tuned and parameterised databases (catalogues)	MUST
All functionalities are integrated in one client program.	MUST
A plurality of modules can be active simultaneously, thus enabling parallel working on documents and data.	SHOULD
One menu prompts for all functions.	SHOULD
Web interface: - End user Access - Data editing and administration is possible via web-browser.	 MUST SHOULD
Multilingual Interface: - Navigation in different languages with switch over possibility - Possibility to store content in different languages with switch over possibility during consultation.	MUST
Help features - General help - Context--sensitive help - Multilingual help	MUST SHOULD
5. Security/Access Control	
Provisions for data security (Secure Shell, SSL, etc.).	MUST
The system supports different levels of authorizations for administrators, users, user groups and guests.	MUST
User specific authorizations can be assigned updated.	MUST
Module specific authorizations can be assigned.	MUST
Authorizations for specific data fields can be assigned.	MUST
Security checks are performed when a record is updated.	MUST
6. System Operation	
A short reaction time when system fails.	MUST
There is a parallel test system running without additional licensing costs.	MUST
System availability: 7/24	
Automated upload of new data from the distributed repositories	
Reasonable response times (to be specified)	
Sound recovery procedures and fallback scenarios	
Hosting and/or back up facility for the collection management systems of Content Providers	
Logging mechanisms for the REGNET System-use (technical and content statistics)	

7. Documentation and Support	
On the spot - training courses for system administrators and officials in charge, a detailed training course agenda and documentation.	MUST
Help Desk	MUST
Technical support (on-site) - Error handling by an (Austrian/local) branch with specialised staffs.	 SHOULD
User Manual - Online - Paper-based in different languages	 MUST SHOULD
Documentation - of data fields - of error messages - A variety of teaching aids.	SHOULD
8. Other(s)	
Setting up of Service Level Agreement (SLA)	
Setting up of coherent pricing schemes	

Table 18: General and technical requirements

C. Specific and functional requirements	
Broad access to cultural heritage and a variety of geographically distributed information	
Definition of standards to be used to open the full catalogue of cultural heritage objects (CHOs) to a broad range of users (occasional visitor to scientist) and devices (from handheld to personal workstations and kiosks). Wireless access is a high priority.	
Different Content Schemes: Device-, user- and region-dependent content schemes for storage, search and retrieval and consultation.	
Mechanism through which thematic text contributions by third parties can be handled: draft reception, editing and approval, publishing	
Strong focus on edutainment (education and entertainment) and scientific use.	
Storage mechanisms with the possibility to contain descriptions in different languages of the same text and/or object.	
C.1 Data Management	
Data format/Data structure	
- Development of a structure of texts based on themes, preferably common to a number of participating regions, and intelligent cross-referencing between these texts (on a REGNET server) and objects of the existing collection.	
- A facility to set up different presentation levels for the same item. Text-levels: identification (title, author), summary and full text. Image-levels: thumbnail, screen resolution and high resolution.	
- Standard data structure or data field catalogue for the description of objects.	
- Support of international formats and rules for the coverage and structuring of documents (XML, etc.).	MUST
- The user can define data fields and is supported by the software in doing so.	MUST
- The system supports hierarchical and networked structures for the accession of complex objects and group of objects (ensembles, e.g. a triptych)	MUST
- A plurality of pictures can be linked to a data record.	
- Data fields can be grouped together and the group can be repeated at random.	MUST
- No strongly predefined hierarchical structure, but extendable formats in which new content contributors can add new content threads with the possibility to link (web them up) with already existing content.	MUST
- A clear data entry system: mandatory fields and optional fields - A flexible object number entry field	SHOULD
Editing of a personal profile for news and alerts; personal office providing e-mail, chat-rooms, calendars, to-do-lists	SHOULD
Public notice board for requests and questions	SHOULD

C.1 Data Management	
Data Import/Export	
- The entire record can be imported (comprising hierarchies, thesaurus etc).	MUST
- Object and description data can be imported via batch jobs.	MUST
- The system disposes of a report generator, capable of exporting every single data bank field.	SHOULD
- Data can be exported	MUST
Data entry/Data editing	
- A general „find and replace“ of entries is possible.	MUST
- Automatic logging of batch jobs.	MUST
- A wide variety of text processing functions (e.g. select, cut, copy, paste, etc.).	MUST
- A permanent display of the most important record information (e.g. the inventory number).	MUST
- Partly filled in data records can be stored as hold-files.	MUST
- These files are stored separately and are not taken into account when a search is performed.	MUST
- Abbreviation lists can be defined, and abbreviations can be replaced automatically by an integral information.	MUST
- The deletion of data can be reversed (either on the server and/or the client).	MUST
- Batch-jobs can be automated (e.g. always during nighttimes).	SHOULD
- The user can define an change standard inputs for certain fields.	SHOULD
- Changes in records can be taken back (by client and/or server).	SHOULD
- Possibility of local registration of data	MUST
Data validation/Check handlers	
- Data items can be compared to open or secluded word lists at input or at some later moment.	MUST
- When saving or leaving a record, the user is prompted to fill in mandatory fields which he has not filled in yet.	SHOULD
- The different check routines (e.g. date, signature) can be defined individually for every single field.	SHOULD
- When saving, a check is performed whether there already exists a record (e.g. check of the inventory number).	SHOULD
- Thesauri, dictionary or norm data is included in the terminology check.	SHOULD
Data output/Printouts	
- Data records can be collected in a pool for printing.	MUST
- Predefined print formats (e.g. labels, lists, reports etc.)?	MUST
- A free selection of what is to be printed is possible when running the application (e.g. search results or actual document).	SHOULD

- When printing, linked documents or data can be included. - Export filters for the preparation of prints in other programs.	SHOULD SHOULD
Indexing of fields - The saving of a record entails an automatically update of the index. - Fields and field combinations for indexing can be selected freely as well as the index in which the data will be imported. - The form of the index can be chosen freely (word- or phrase-index).	 MUST SHOULD SHOULD
Vocabulary Control: Authority Control and Thesauri Control	
Object information should be approachable by at least two different concepts: The database access and the context access. The context access will create added value to the objects, since it will place each object in relation to several others. This will be done by the additional development of a structure of texts based on themes.	
C.2 Collection Management	
Domain-specific functions - Object Entry - Acquisition - Cataloguing - OPAC - Inventory Control - Location and Movement Control - Conservation Management - Rights and Reproductions - Exhibition Management - Dispatch - Loans - De-accession and Disposal	
Digitising - Systems and methodologies to carry out the digitising of existing paper-based catalogues	
Migration - Rules and interfaces for an easy migration of digitised items in existing catalogued systems	MUST
Intellectual Property Rights-mechanisms for texts and images (identification, authentication, digital object numbering, watermarking, …)	
Special Collection Management - When an object is relocated, the previous location will be added automatically to the list of former locations. - Location or storage management is possible. - The location module is linked to other modules. - Location management is possible via bar code label system.	 MUST SHOULD SHOULD SHOULD

- How are transactions concerning objects and products processed respectively gathered in the system (acquisition, loan, and sale)?	SHOULD
- How are these transactions processed especially in the accountancy module?	SHOULD
- There is a module for the documentation of editing processes within the collection (workflows, object transfers, restoration, object condition etc.).	SHOULD
C.3 Search and Retrieval	
General requirements	
- Ability to search multiple databases simultaneously	
- Ability to browse (e.g. from a table of contents) without first performing a search, and with some use of hypertext links	
- Different search modes (for less experienced and advanced searchers) and options	MUST
- A search can be performed through different modules and data stocks.	SHOULD
Search modes	
- Forms-based construction of queries	
- Free-text searching on all fields (for end users within certain boundaries (deterministic)	
- Subject searching capabilities available for all document collections	
Search options	
- Boolean Search	MUST
- Wildcard Searching/Variety of truncation options	SHOULD
- Range searches	SHOULD
- Empty data fields can be searched.	SHOULD
- Phonetic search possible (e.g. Meier also finds Mayer).	SHOULD
- A correct sorting of numbering systems with alphanumeric structures is guaranteed.	SHOULD
- Pre-listed search: categories, theme search, key words etc.	
Query Results	
- Comfortable, user defined display of search results.	MUST
- Several options of display formats/Variety of display options (e.g. gallery, list, etc.)?	MUST
- Search results can be sorted according to own criteria.	
- Zooming possibility on images with high resolution (rules for resolution and formats)	MUST
- Clear dimension reference for the displayed objects (also at zooming)	
- Thumbnails and/or other picture formats (e.g. JPEG, GIF) are generated automatically by the system.	MUST
- No additional software is needed for the visualizing, browsing or picture editing; if additional software is needed, it can be implemented via java-applets.	SHOULD

Other - SDI alerting facilities across all document collections.	
C4. Navigation	
Context of navigation - Constant awareness of the current context on the screen during navigation (notions “session” and “context”)	
Personalised navigation - Personalised navigation and possibility to recall the consulted information (profiling and storyboard)	
C.5 Reports	
Pre-defined Reports	
User-defined Reports	
C.6 e-Business functions	
Modular differentiation into “free” and “to pay for” information	SHOULD
Selling catalogue items: objects (replicas, posters) and texts (books, brochures and digital texts)	
3D-presentation for object items of the selling catalogue	
Easy to use payment mechanism (in Euro), also for the digital texts. Micro payments or a kind of pay cards (fixed fee or token based)	MUST
Discount for members	SHOULD
An easy access and overview of the nearest by (REGNET) institutes providing digitising services should be in the REGNET B2B section for those institutes not able to buy one for themselves	
C.7 Subsidiary functions	
Useful tools for statistic evaluation (e.g. system utilization, logged-in users, acquisition statistics etc).	SHOULD
A bar code label system can be integrated into the program.	SHOULD

Table 19: Specific and functional requirements

5 The theme-based approach within REGNET

From the beginning on the theme-based approach was worked out as one possibility to realise a thematic access to the REGNET System and to offer added value in connecting objects to each other. This chapter describes the theme-based approach from a rather conceptual point of view, lists the themes to be covered in the first phase of the project and gives some guidelines to prepare themes and fragments according to the underlying approach as well as with regard to the concept of topic maps.

5.1 The themes & fragments approach – towards a viable solution

Within REGNET a theme is a method to explore the European cultural heritage. It can be defined primarily as an indirect way of access to the object information that is available in the databases of memory institutions through the context of those objects. Users are offered the possibility, on top of the standard direct search through the object databases, to discover collection items through examples from the databases via thematic texts. A theme is a collection of thematic texts and/or objects that have one or more characteristics (“keywords”) in common. One can easily understand that with this approach the theme concept is a quite flexible one and that a single thematic text can show

up in different contexts. It is in fact not the content provider who determines the theme but the user who queries the themes database. Themes can either refer to thematic texts only, or to collection objects only or, in most cases, to both, thematic texts and collection objects.

A thematic text is called a fragment. Each fragment covers a certain aspect of a theme. The scope of such an aspect can range from very wide ("Measuring time") to quite narrow ("Water clocks in ancient Egypt"). Figure 11 illustrates the connections between themes, fragments and objects.

Originally, a theme, in the concept of REGNET, should not be defined as a *predefined* set of thematic texts. The constituting parts of themes, such as fragments, should be build up of data containing a set of keywords that describe the context and scope of the content. Those parts can be grouped together into a theme by the keywords that accompany them. Through these keywords new themes that have not been foreseen by the content providers can come into being. One can easily imagine that a text that has been written as part of a range of texts about measuring time can also show up as part of a theme about famous scientists. A contribution about a certain saint can show up in a theme about things or persons of which people believe that they will give protection.

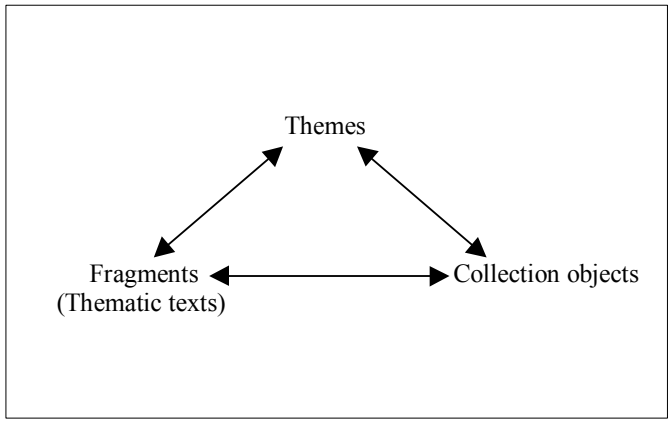


Figure 11: Themes - Fragments - Objects

Let us take this last subject as an example. For the REGNET web site, content providers will prepare thematic texts about "Saints". Information about different saints can be found. They are treated as historical persons, relevant presentations are described as well as the attributes with which they are mostly shown. One of the fragments is also about their role in the religious life of people. One can learn for example that St. Christopher is believed to protect travellers. Other content providers have worked on a theme about masks. The role of masks in different cultures is treated and one can learn for example that some masks are thought to provide protection to the one who wears it.

Different fragments from completely different resources and originally related to completely different themes may have the term protection as an attribute, and all these fragments together may constitute a new theme, not explicitly foreseen by the content providers.

However, in order to start with the production of fragments for the first REGNET-Demo a certain top down approach (← → the keyword bottom up approach described higher) has to be adopted. Hereby each content provider has to choose a few appropriate themes, within which she/he can develop a substantial number of relevant fragments. It is highly preferable that the choice of the themes and fragments relates to the available object images and descriptions in the respective collections. It must be stressed that this initially restricted theme choice is only used to guarantee a substantial amount of information for the concerned themes.

By the intelligent choice of "keywords" in fragments and "relation to" elements in Dublin Core notations of objects other (higher level) themes will be automatically created. Most of these higher level themes will not contain direct references to fragments in a first stage but they will be fully used in the search and retrieval functionalities. One can even imagine that a certain associative structure, comparable with one kind of hierarchy, between themes can be created under the condition that a substantial number of fragments and objects can be retrieved indirectly upon a query on one of these themes.

It is clear that the number of themes and fragments will be extended during the project's lifetime.

5.2 Guidelines for the choice and delivery of themes, fragments and objects

5.2.1 Information requirements

REGNET as an R&D project should demonstrate the viability of the theme approach. To enable this demonstration the information that will be developed should meet several requirements:

- There should be a substantial amount of fragments containing a factual description of a basic Cultural Heritage (CH) topic.
- A user who is interested in a certain theme should receive a substantial amount of information.
- This information should be from different sources, managed by different types of memory institutions.
- There should be a substantial amount of fragments that may fit to different themes.
- A substantial set of object images and descriptions should be related to these fragments.

5.2.2 Themes

5.2.2.1 Topic maps – enabling knowledge management

The concept of topic maps originated in the domain of information management as a way to represent knowledge structures for indexes, glossaries, thesauri and cross-references. This paradigm suits very well theme based processing and references to fragments and objects. The major benefit of topic maps lies in the fact that they use independent linking and addressing mechanisms related to the real content. Navigation and queries become more accurate compared with full text indexing and search. It is also notable that the underlying ideas of topic maps come very close to that of semantic nets.

In our case we will adapt the XTM 1.0. -specification (XML Topic Maps Specification). There exists also an ISO 13250 Specification).

Some of the key element types of XTM that will be used in REGNET are:

topic	: an object within a computer that represents some subject; e.g. a person, thing, concept, notion,…
topic name	: an explicit name for a topic (e.g. St-Angela)
occurrence	: information resource that is pertinent to a subject
association	: relationship between topics (written by, influenced by, born in, etc.)
scope	: defines the limit of validity of topic name, occurrence and association

More details about topic maps can be found on the REGNET web site or in professional literature. On the server an already worked example realised on the basis of XML and imported in a topic map viewer tool, the Omnigator, can be found. It is a good starting point to visualize topic maps and to show how they work.

In general we can say that topic maps describe knowledge structures and associate these with information resources. The use of XML can be rather complex at the moment but this will normally be hidden from the content author by the special data entry tools (see fragment data entry template) that will generate the necessary XML code for XMT from the fragments data entry fields. The same applies for other XML-based data (real content and copyright related things for instance). See also figures “VIEWS” (Figure 12) and “Theme Scheme” (Figure 13).

5.2.2.2 The selection of themes

The previous requirements have important implications for the initial selection of themes to be worked on by the content providers in the REGNET consortium.

- They should be quite limited by scope: not history but the history of the Second World War, not European Art History but Expressionism in the European Art or even smaller focuses.
- There should be contributions from different partners to each theme. In this respect we should distinguish between two different types of contributions: at least two partners should contribute fragments to a theme. At least four partners should provide access to artefacts that are related to those fragments.
- There should be a clear overlap with at least one other theme.

See also the graphical representation “VIEWS” (Figure 12). Themes of the type corresponding with the ones in the lower third part of the cube are preferred in the first phases of REGNET.

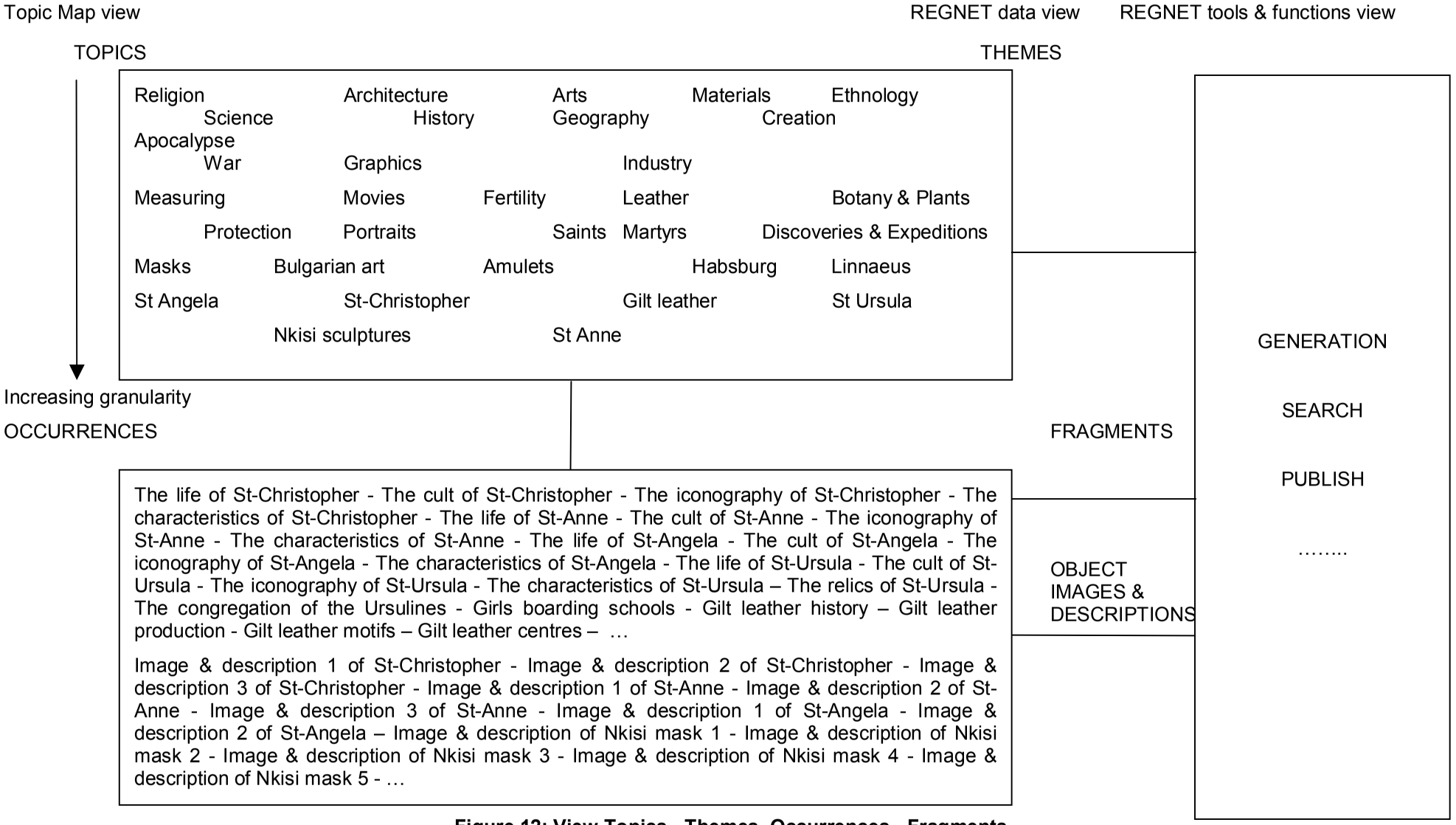


Figure 12: View Topics - Themes, Occurrences - Fragments

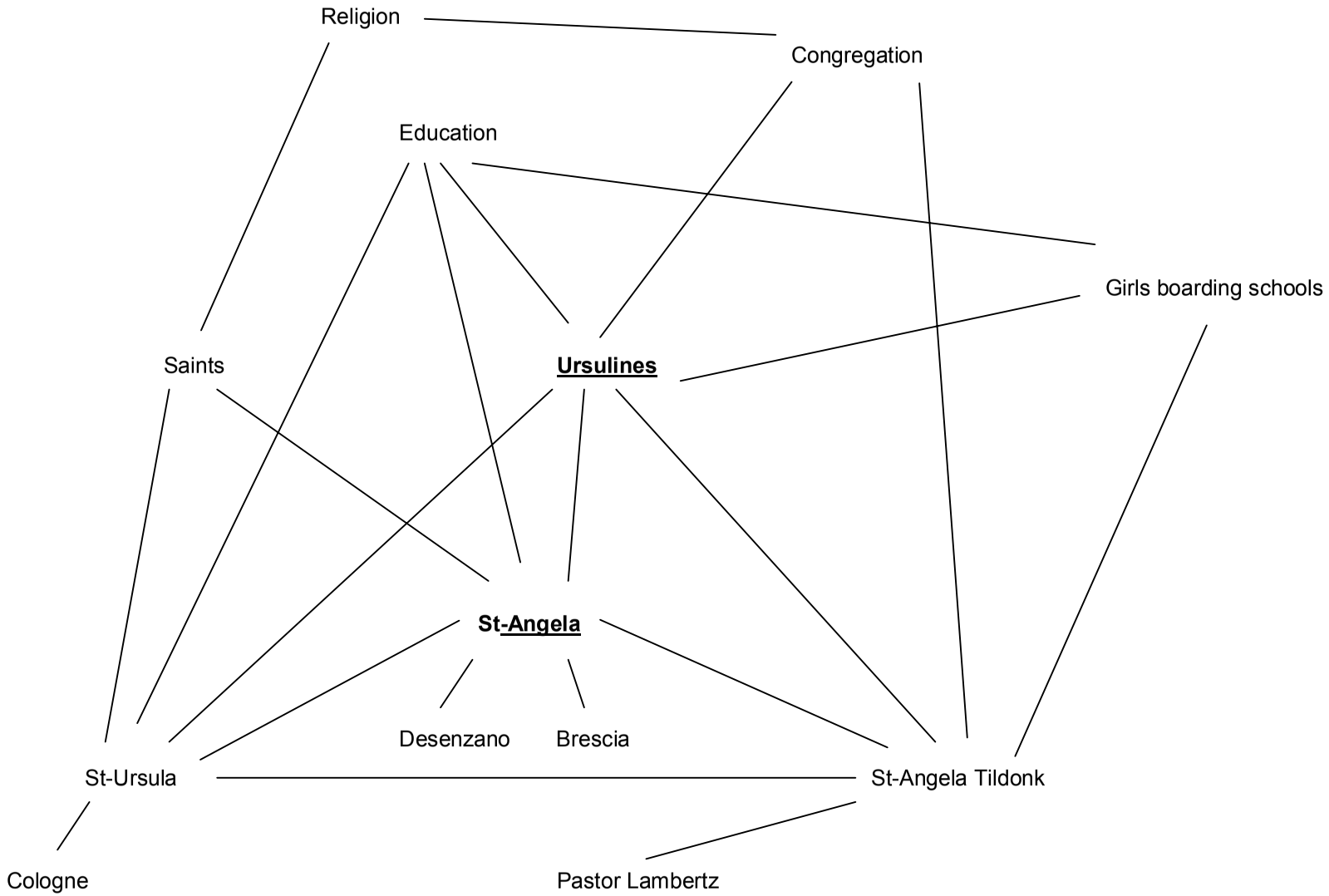


Figure 13: Example of a theme scheme

A first selection of themes was already made by the content providers. Table 20 lists this first selection with all possible contributors and leaders whereas leader is not meant in terms of responsibility but as possible contact person for the coordination. The themes were selected on the basis of objects available in the collections. Theme-based collection objects were evaluated with help of a theme inventory worksheet which could be found in Appendix 5.

Theme	Leader	Contributors
SAINTS	MECH	ALI, MECH, MUS, TARX, LMG, ONB
MASKS & AMULETS	MUS	MUS, ALI
MEASURING	MUS	KVA, MECH, MUS
HABSBURG Elisabeth	ONB	ONB, IMAC, MECH, ALI
EARLY RENAISSANCE in EUROPE	ALI	ALI, MECH
LINNAEUS	KVA	KVA, SUL, ALI, MUS, ONB
TOUR d´ HORIZON	IMAC	(top 10 pieces of every content provider)
LEATHER	MUS	MUS, MECH
GILT LEATHER	MECH	MECH, MUS
REGNET Art Galleries	ICCS	GRAN, ALI, ICCS

Table 20: List of themes

5.2.3 Delivering fragments

5.2.3.1 Rules

Although a fragment may be considered as an independent unit of information, it may be useful to provide some instructions about its contents:

- In each fragment only one aspect of a larger theme should be treated.
- A fragment should contain a clear reference to an overall theme. For example, if someone writes a fragment that is related to St. Christopher, this name should be mentioned somewhere in the title, the text and the keywords.
- The content of a fragment has to make sense when consulted on its own (all relevant items has to be mentioned).
- The fragmentation of content must be governed by a high degree of reusability.
- A fragment does not contain any explicit hierarchical relations.
- The content of a fragment can be supported by other multimedia elements via references to links.
- A list of primary and secondary keywords within the fragment is the reference for search mechanisms and theme building.
- Type of language, audience level and size level must be indicated at the editing process.
- Every different combination of language, audience level and size level (short and full content) provokes a separate editing cycle and a separate entry in the database.
- Fragments have to be validated before publishing.
- Full content must be as a minimum close to one full screen.

- Short content must be referenced to the screen of mobile devices.

5.2.3.2 Template for data entry of fragments

Fragment name	title
Language	EN for English, NL for Dutch, …
Audience level	generic, children, students, scientific, …
Size level	short or full
Author	
Contribution	
Date	
Modified by	
Modified date	
Modified description	
Copyright	
Cost	
Content	Text with embedded references A reference is a number: e.g. (1) = reference to link 1
Links	(1): description of an action and/or URL of resource referenced by (1) (2): description of an action and/or URL of resource referenced by (2) …..
Primary keywords	most relevant
Secondary keywords	second order
Number	digital object identifier

5.2.4 Validation

In order to obtain a high degree of coherence, consistency and standardisation, it will be necessary to install a kind of editorial committee. This committee will check the fragments on “REGNET-compliance”. Fragments that meet the validation requirements receive a “REGNET certified”-label and will be published in the corresponding REGNET databases.

5.2.5 Collection management data – digitising by priority

Within REGNET, the status of the collection management systems of the respective content providers ranges from fully digitised collections till collections that have still to be digitised. In order to obtain a consistent demo, the priority of digitising and/or making the data electronically available should be governed by the type of fragments that will be developed and the themes that will be chosen. The individual digitising plan of every content provider should take this fully into account by working out a convenient strategy compliant with the theme-fragment production. Probably there will be a phased realisation of the complete digitising: phase 1 being a mock up to show feasibility (month 6), phase 2 being version 1 of the demonstration (month 12), phase 3 being version 2 of the demonstration (month 15), phase 4 being the refinement and further implementation of the digitising (month 24, end of the project). Depending on the results and size of the different collections, further phases can be foreseen after the REGNET project’s lifetime via the Cultural Service Centres or other initiatives.

For those who use already a collection management system, it should be wise to contact the manufacturer of the system in order to get the necessary information about their solutions for Dublin Core, Z39.50 and perhaps other interesting features related to making collections electronically reachable.

Part 2 The digitising plans and activities

6 Introduction

6.1 Purpose

The purpose of digitising activities in the context of the REGNET project will not be primarily to preserve rare and fragile collection items but to enhance *access to the available collections* in order to offer new business possibilities, thus enabling the partners to compete on the market by offering high quality digital assets. As the state-of-the-art analysis revealed, these collections vary widely in object type, size, quality and quantity. Besides real objects (to be found e. g. in museums), bibliographic objects in libraries and archives and media objects (surrogates like images, films etc.) must be considered in planning concrete documentation and digitising activities. Each of these object types brings their own problems and must be handled in an appropriate manner. Just a minor part of the collections is already digitised, not all objects are even catalogued.

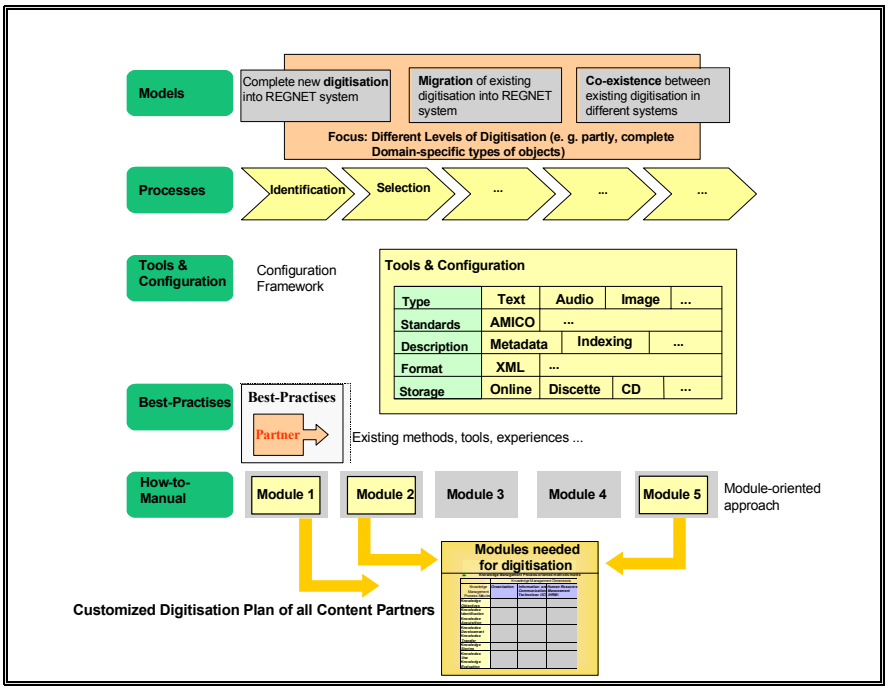


Figure 14: Objectives of WP 1.2

WP 1.2 was dedicated to the development of concrete plans for content creation and management based on sound methods and standards, following best practice models. The goal was to provide a methodology which could serve as a “general” digitising plan to be used as a guideline for all activities to be undertaken in the next phase of the project. This plan should list all issues to be considered before starting and all tasks relevant for digitising projects in general. On this basis the partners should develop there own "customised digitising plans" by adapting the provided “modules” for their own institution. Figure 14 shows the objectives of WP 1.2 and the developed multi-step approach: Elaboration, specification and description of various models for the different contextual digitising settings will provide the base. After that a description of the different processes within the digitising framework will be compiled. A systematic view at the different layers within the digitising process forms the configuration framework. From this framework the necessary tools for the digitising procedure can be derived. Some Best-Practices for the digitising process that are to be collected will provide concrete examples for specific circumstances. In the next step a How-to-Manual will be produced which will consist of several modules. Like a menu, the participating institutions can select relevant modules in order to plan and realise the digitising of their respective collections.

6.2 Overview and document structure of Part 2

This report focuses on the work and main results of task 1.2 belonging to WP 1. Starting from principles of digitising activities ("the starting points") the following elements are picked up:

- descriptions of different models (type of collection and objects, type of description, type of digitising),
- description of (digitising) processes
- description of tools for digitising and (technical) standards
- presentation of best-practice examples
- customised digitising plans for all partners

The results of this WP will include a plan how to prepare the content of the different content holders - with consideration of different frameworks and the possibility to customize (according to the selected module-based approach).

6.3 Partners and tasks

The directly involved partners and the assigned tasks are listed in Table 21. Additionally all content partners should provide a customised digitising plan for the organisation, which shows how they want to proceed in the next phase.

Partner Name	*Acronym*	*Task*
Information & Management Consulting, Berlin, GERMANY	IMAC	Task Leader: Task Management, definition of work and expected results, definition of worksheets sheets, IR 1.2
AIT - Angewandte Informationstechnik Forschungsgesellschaft mbH, Graz, AUSTRIA	AIT	Contribution to IR 1.2 (conceptual issues), description of models
Österreichische Nationalbibliothek, Wien, AUSTRIA	ONB	Best-Practice in picture archives, description of digitising models, customised digitising plan
Stockholm University Library, Stockholm, SWEDEN	SUL	Customised digitising plan for all regional content providers (SUL; KVA; LMG; NRM)
TARX nv, Hofstade, BELGIUM	TARX	Concept of regional digitising centres
Museon, Den Haag, NETHERLANDS	MUS	How-to-manual, customised digitising plan
IAT - Instituto Andaluz de Tecnologia, Sevilla, SPAIN	IAT	How-to-manual, customised digitising plan
ZEUS Consulting S.A., Patras, GREECE	ZEUS	Tools & configuration
Institute of Computer and Communication Systems, Bulgarian Academy of Sciences, Sofia, BULGARIA	ICCS	How-to-Manual, customised digitising plan
Consorzio Civita, Rome, ITALY	CC	Description of models, how-to-manual, customised digitising plan for all regional content providers

Table 21: Partners involved in WP 1.2

7 Starting points and choices - Models for digitising

In order to build the theoretical framework for digitising within the project first of all an overview about the different *models for digitising* should be given. By taking also intermediate steps of digitising into account this "scheme" offers a comprehensive approach. Such intermediate steps could be the digitising of card catalogues, microfilms and microfiche - procedures which will be important for retrospective digitising. Setting up and adapting these models for different collections is bound to the different possible object types in cultural heritage institutions: all object types must be handled in an appropriate manner (with appropriate tools and standards), all cause specific problems and claim different methodologies - also with regard to the aimed *type or level of digitising*. The connection between the selection of object types and digitising levels is explained in Chapter 7.1. In order to relate the digitising models to the REGNET System, the way to integrate digitising into the REGNET System is described in Chapter 7.2). To complete this first theoretical framework, which could and should offer an orientation about issues to decide upon and to bear in mind before starting digitising, some relevant explanations will be given for the different models, respectively processes related to them (Chapter 7.3).

7.1 The different digitising models

7.1.1 Object type –Type of Description –Type of Digitising

Objects stored in museums, libraries, archives and art galleries represent a wide range of types, size, material, quality and quantity. First of all, each object has to be described and recorded in a digital catalogue. Other processes and techniques appropriate for converting the original to digital form are mainly depending on the type, size and condition of objects.

Following types of digitising are taken into account (Table 3):

- textual description,
- 2D surrogates of originals,
- 3D surrogates of originals,
- electronic texts,
- electronic video and audio,
- automatic recognition of image/video contents.

Type of digitising	*Object type*
textual description of objects according to international standards e.g.: CIDOC, MDA Spectrum in Museums EAD, ISAD (G) in Archives ISBD (G), MARC in Libraries CDWA in Art Galleries	real objects (artefacts, objects of everyday life, maps, etc.)
	bibliographic objects (books, journals, newspapers…)
	media objects (films, photographs, sound storage medium, digital data)
	archival objects (charters, files, letters, manuscripts etc.)
create digital **2D images** of objects, scanning bibliographic objects is mainly an intermediate step for final OCR	real objects
	media objects: photographs, slides
	archival objects, hand-written manuscripts
	bibliographic objects
	card catalogues, microfilm etc.

produce digital **3D models** of objects: overlapping scans from multiple points of view over the complete surface are made. Once scanned, data modelling and display software is used to merge or integrate the multiple view data sets into a high resolution 3D digital model of the object. e.g. object description with VRML/X3D	real objects (artefacts and objects of everyday life, etc.)
produce **digital texts** with OCR Software	images of bibliographic objects, typewritten manuscripts
	images of card catalogues, microfiches, microfilm
digitise **audio/visual material** in the traditional analogue format using data capturing software	media objects: audio tapes, gramophone record, videos, films
capture the content of images/videos with **automatic recognition** of image/video contents software	media objects: digital images, video

Table 22: Types of digitising and types of objects

One additional point concerning digital material has to be mentioned: There is an increasing amount of primary digital data (administration, research) stored by Cultural Heritage Institutions, especially by archives. Digital preservation will be one of the most important issues in Cultural Heritage Institutions (e.g. knowledge about long-term digital preservation). Description of digital assets should also be based on international standards.

7.1.2 Levels of Digitising

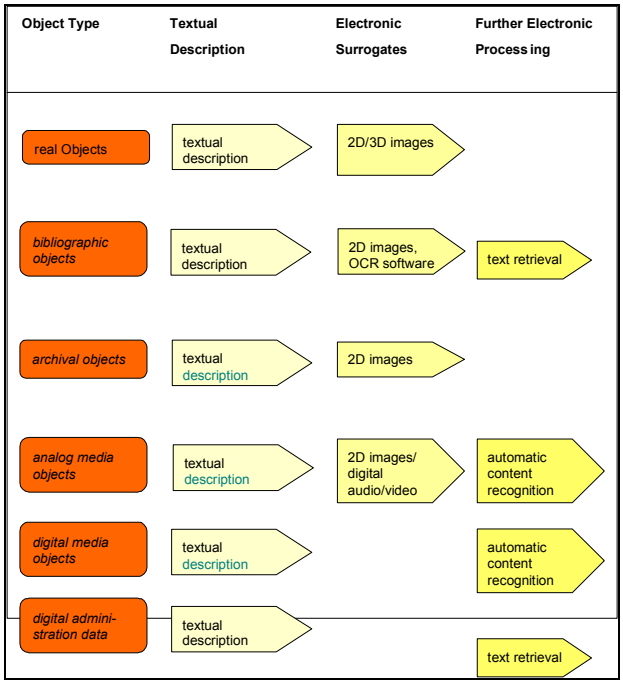


Figure 15: Levels of digitising

The three levels of digitising are outlined below. The first level is to describe the objects (e. g. according to standards valid for different object types and established in different domains) and

catalogue them in a digital catalogue. This is in some respect the basis for all digitising activities and enhances and supports the access and retrieval of digital items. The second level is the creation of an electronic surrogate of the original. Possible electronic surrogates were described in Table 3, e. g. 2D and 3D images). The third level of digitising is the further electronic processing of digital versions/surrogates, e.g.: search and retrieval or (in some cases) automatic image/video content recognition.

7.2 Integration of Digitising into REGNET System

Due to the variety of institutions within REGNET there are different situations in the level of digitising to be considered: complete new digitising, migration of existing digitising as well as co-existence between existing digitising in different systems. These circumstances have to follow different digitising strategies, but on the other hand there are similarities between them.

7.2.1 Complete new digitising into REGNET System

Standards are the key to effective sharing of resources and system interoperability. Guidelines and standards have to be defined for a complete new digitising into the REGNET System. Metadata is most often divided into three conceptual types:

- Descriptive metadata: Standards for creating descriptive metadata of originals are defined as in Dublin Core standards.
- Structural metadata: Information used to display and navigate digital resources; also including information on the internal organisation of the digital resource.
- Administrative metadata: Represents the management information for the object (information needed for access and display, rights). Administrative metadata might include the resolution the image was scanned at, the hardware and software used in producing the image, compression information, pixel dimensions, etc. (Dublin Core Metadata A-Core).

In addition it may be useful to specify what range of formats is to be handled by the system for texts, images, audio and video.

7.2.2 Migration of existing digitising into the REGNET System

Which standard an institution adopts depends on a variety of factors, including the type of materials that are being digitised; the potential user; the knowledge and expertise of project staff; and the technical infrastructure available to the institution. The level of details provided also varies from institution to institution. Migration of existing digitising into REGNET System requires a set of transformations (crosswalk) to make contents of elements defined in one metadata standard available to target metadata standard:

- Semantic data transformation: Various databases use different terms for data fields containing in fact the same matter (domain specific vocabulary). These field names are converted to metadata standard subject terminology. A matrix will be specified with semantically equivalent elements in the target metadata standard to each element of the source database.
- Content transformation: A converter is added which will convert files into a format which can be handled by the REGNET Ontology. Conversion rules are based on the defining properties of the source and target metadata element, and also on the content of source metadata elements (particular data type, range of values, controlled vocabulary, etc.).

Structure and content of various catalogue systems will not suit international standards. So, export of these heterogeneous data to a standardised target system needs the establishment of special rules. One possible solution may be to develop a minimum set of elements that must be included in each metadata or cataloguing record. The core elements are based on the 15 Dublin Core elements. The remaining elements (also Dublin Core) are optional, but desirable. Integrity of data and document types will be controlled by REGNET Ontology checker.

7.2.3 Co-existence between existing digitising in different systems

It should be possible that heterogeneous local catalogue systems participate in the REGNET System. The aim is to support cross-database searching on web-based systems. The REGNET System will have to be able to load records from various metadata standard-based records.

An interface has to be implemented which will retrieve data directly from the local collection management system and will be able to convert access version of digital data “on the fly”.

7.3 Scanning and digitising processes for the different models

An introduction to the basic processes bound to the different models of digitising are pointed out in this chapter, in order to point out main starting considerations.

7.3.1 Digitising of 2D images

7.3.1.1 General explanations

A 2D digital image is an electronic representation of an analogue image. The reasons why it is necessary to digitise images are:

- good conservation,
- improved access,
- added value and increased usability,
- faithful copying,
- rapid retrieval.

The digitising process begins with the identification of a physical object to be digitised (a rock, a photograph, a glass slide, a book, a banner, etc), and could be seen to end when that object has been through all the processes necessary to obtain the digital version and is back where it started in the archive or collection it came from. In fact, the process doesn't really end there, as all the long-term issues of access, storage, preservation, migration, refreshing, etc. There are several kinds of digitising equipment available suitable for different kinds of originals and different quality requirements. The main options for digitising are:

- flatbed scanners
- slide scanners
- Kodak Photo CD
- drum scanners
- digital cameras

These are described in the following sections. Their use depends upon the 'digitising chain' being used in any particular case, three types of chain are shown in Figure 16.

The factors which influence in digital images quality are:

- matching sources with technology.
- equipment.
- file formats.
- monitor or printer.

It is essential to establish the objectives for which materials might be used before digitising. Important factors in the digitising process:

- resolution: number of individual data collections taken vertically and horizontally.
- dynamic range: range of tonal differences between light and dark segments of the image.

- bit-depth: number of bits used to represent each pixel.

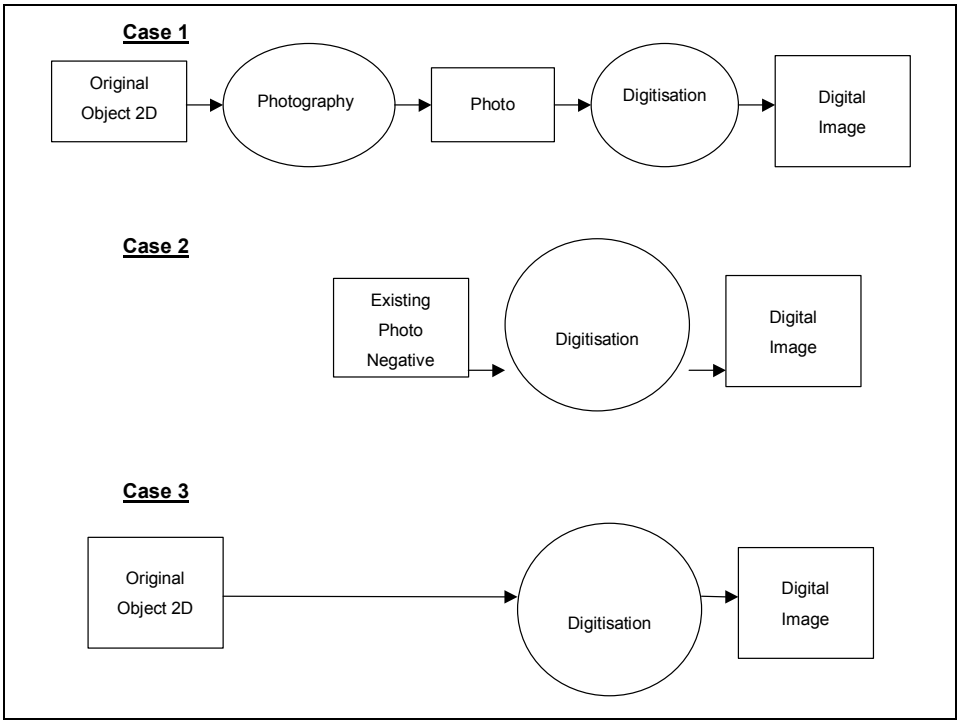


Figure 16: Types of "digitising chain"

Images can be supplied in a number of formats, of which the most common are:

- Tagged-Image File Format (TIFF) - standard format used to exchange files between applications and computer platforms, and for printing purposes. TIFF files support LZW compression.
- Joint Photographic Experts Group (JPEG) - format commonly used to display photographs and images over the WWW and other online services.

7.3.1.2 Digitising Microfilm

While the digital file is a brilliant access medium, its long-term life cycle remains an issue of debate. Microfilming and then scanning the film addresses both the preservation and access issues.

Scanning from film is a cheaper and less technical approach then scanning directly from the original. However, as microfilm is usually available in black and white, scanned film will not have the colour and tonal range of the original material. For this reason, this approach is particularly suitable for material such as newspapers, record books and other text-based materials where there may also be a preservation angle to consider. Our microfilm is currently scanned outhouse by commercial providers. In the very near future, we hope to start offering full-text searching of digitised microfilm.

7.3.2 Recognition of image/video contents

7.3.2.1 General explanations

Document analysis or more precisely, document image analysis, is the process that performs the overall interpretation of document images. Document analysis is concerned with the global issues involved in recognition of written language in images. The process of determining document structure may be viewed as guided by a model, explicit or implicit, of the class of documents of interest. The model describes the physical appearance and the relationships between the entities that make up the document. In practice, a document analysis system performs the basic tasks of image segmentation, layout understanding, symbol recognition and application of contextual rules in an integrated manner

The quality of a digitised image is dependent on both the quality of the original source material and the adoption of a digitising pathway which minimises quality loss.

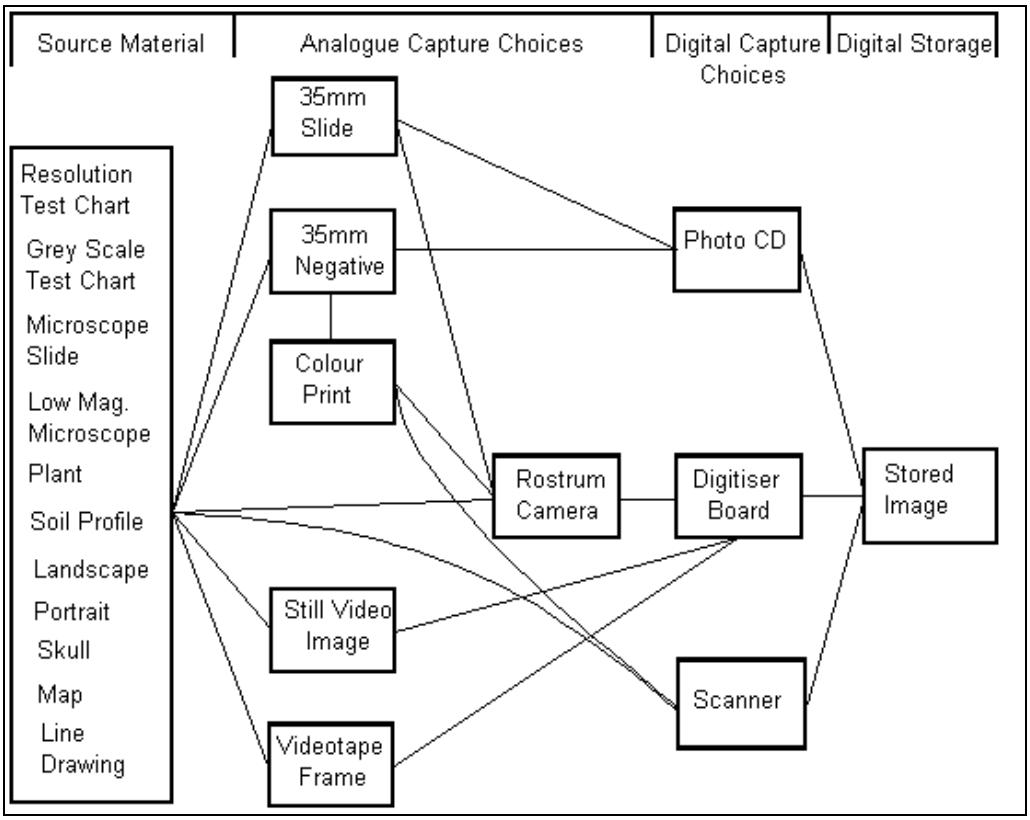


Figure 17: Recognition of image/video contents

7.3.2.2 Stages in the recognition process

Decomposition and Structural Analysis: Documents consist of text (machine-printed and hand-written), line drawings, tables, maps, half-tone pictures, icons, etc. It is necessary to *decompose* a document into its component parts in order to process these individual components. Their *structural analysis*, in terms of spatial relationships and logical ordering, is necessary to invoke modules in appropriate order and to integrate the results of the appropriate modules. Partitioning of an image into several constituent components is called segmentation. Segmentation is an important part of practically any automated image recognition system, because it is at this moment that one extracts the interesting objects, for further processing such as description or recognition. Segmentation of an image is in practice the classification of each image pixel to one of the image parts. If the goal is to recognise black characters, on a grey background, pixels can be classified as belonging to the background or as belonging to the characters: the image is composed of regions which are in only two distinct grey value ranges, dark text on lighter background.

Text recognition and interpretation: It is necessary to recognise words of text, often using lexicons and higher level linguistic and statistical context. The necessity for contextual analysis arises from the fact that it is often impossible to recognise characters and words in isolation, particularly with handwriting and degraded print.

Tables, graphics and halftone recognition: specialised subsystems are necessary for processing a variety of non-text or mixed entities, such as recognising tabular data, converting graphical drawings into vector representation, and extracting objects from half-tone photographs.

7.3.2.3 Image understanding

Image understanding can be divided into meaning, extracting visual information from text describing picture and picture processing.

Meaning: “Understanding" the picture refers to the labelling of all visually salient objects in the picture along with relevant spatial relationships between objects. Once these objects have been labelled, they can easily be placed into an integrated text-picture database (representing the meaning of the entire document).

Extracting visual information from text describing picture: Salient information (in terms of understanding the picture) includes (i) information specifying what objects are present in the picture (*e.g.*, “this photo depicts the main engine of the space shuttle along with the rocket boosters"), (ii) information useful in locating these objects (*e.g.*, “it is in between the fuelling truck and the hangar"), and (iii) information used to identify (*i.e.* distinguish between) objects of the same class. A simple form of identification is made through spatial constraints (*e.g.*, “to the left of"). Processing intuitively non-spatial methods of identification (*e.g.*, “the main engine is larger and has 3 chambers") is considerably more difficult. The main problem to be addressed here is what we refer to as “the correspondence problem". Unlike the previous two segment types (tables and diagrams), there is not a one-to-one correspondence between words and picture elements.

Picture processing: The subsequent interpretation of the picture is guided by information present in the conceptualised graph. A search planner is employed to (i) determine the most appropriate image processing routines to be invoked for a given task, (ii) oversee the order in which various image processing routines are called, and (iii) restrict the search for objects to areas suggested by the caption. The important point is that complex image processing operations are employed only when earlier, simpler operations are not successful. As an example, consider the problem of identifying human faces in a photograph. Assume that an object-location hypothesis process has succeeded in generating possible face candidates (*i.e.*, areas of the image loosely corresponding to the contours of a human face). It is possible to identify the faces by using spatial constraints given by the caption (*e.g.*, ``Tom Smith, left, Mark Brown, centre and ..."). In the example given, we avoid the process of matching face candidates to a database of pre-stored face models. This methodology can be generalised to other object (natural or man-made) classes.

7.3.3 Optical Character Recognition

7.3.3.1 General explanations

Specialised software that recognises characters and produces process able text from scanned images.

Optical character recognition refers to the branch of computer science and involves reading texts from paper and translating the images into a form that the computer can manipulate (for example, into ASCII codes). An OCR system enables you to take a book or a magazine article, feed it directly into an electronic computer file, and then edit the file using a word processor.

All OCR systems include an optical scanner for reading texts, and sophisticated software for analysing images. Most OCR systems use a combination of hardware (specialised circuit boards) and software to recognise characters, although some inexpensive systems do it entirely through software. Advanced OCR systems can read text in large variety of fonts, but they still have difficulty with hand-written text.

The potential of OCR systems is enormous because they enable users to harness the power of computers to access printed documents. OCR is already being used widely in the legal profession, where searches that once required hours or days can now be accomplished in a few seconds.

A typical OCR system contains three logical components:

- Image scanner
- OCR software/hardware
- Output interface

7.3.3.2 OCR software/hardware

The software/hardware system that recognises characters from a registered image can be divided into three operational steps: document analysis, character recognition, and contextual processing.

- **Document Analysis:** Text extracted from the document image is a process known as document analysis. Reliable character segmentation and recognition depend upon both original document quality and registered image quality. Processes that attempt to compensate for poor quality originals and/or poor quality scanning include image enhancement, underline removal, and noise removal. Image enhancement methods emphasise character versus non-character discrimination. Underline removal erases printed guidelines and other lines which may touch characters and interfere with character recognition and noise removal erases portions of the image that are not part of the characters. Prior to character recognition it is necessary to isolate individual characters from the text image. Many OCR systems use connected components for this process. For those connected components that represent multiple or partial characters, more sophisticated algorithms are used. In low quality or non-uniform text images these sophisticated algorithms may not correctly extract characters and thus, recognition errors may occur. Recognition of an unconstrained hand-written text can be very difficult because characters cannot be reliably isolated, especially when the text is cursive handwriting.
- **Character Recognition:** Two essential components in a character recognition algorithm are the *feature extractor* and the *classifier*. Feature analysis determines the descriptors, or feature set, used to describe all characters. Given a character image, the feature extractor derives the features that the character possesses. The derived features are then used as input to the character classifier. Template matching, or matrix matching, is one of the most common classification methods. In template matching, individual image pixels are used as features. Classification is performed by comparing an input character image with a set of templates (or prototypes) from each character class. Each comparison results in a similarity measure between the input character and the template. One measure increases the amount of similarity when a pixel in the observed character is identical to the same pixel in the template image. If the pixels differ, the measure of similarity may be decreased. After all templates have been compared with the observed character image, the character's identity is assigned as the identity of the most similar template. Template matching is a trainable process because template characters may be changed. Structural classification methods utilise structural features and decision rules to classify characters. Structural features may be defined in terms of character strokes, character holes, or other character attributes such as concavities. For instance, the letter P may be described as a vertical stroke with a hole attached on the upper right side. For a character image input, the structural features are extracted and a rule-based system is applied to classify the character. Structural methods are also trainable but construction of a good feature set and a good rule-base can be time-consuming. Many character recognisers are based on mathematical formalisms that minimise a measure of misclassification. These recognisers may use pixel-based features or structural features. Some examples are discriminating function classifiers, Bayesian classifiers, artificial neural networks (ANNs) and template matchers. Discriminating function classifiers use hyper surfaces to separate the featured description of characters from different semantic classes and in the process reduce the mean-squared error. Bayesian methods seek to minimise the loss function associated with misclassification through the use of probability theory. ANNs, which are closer to theories of human perception, employ mathematical minimisation techniques. Both discriminating functions and ANNs are used in commercial OCR systems.
- **Contextual processing:** Contextual information can be used in recognition. The number of word choices for a given field can be limited by knowing the content of another field, e.g., in recognising the street name in an address, by correctly recognising the ZIP Code, the street name choices can be limited to a lexicon. Alternatively, the result of recognition can be post-processed to correct the recognition errors. One method used to post-process character recognition results is to apply a spelling checker to verify word spelling. Similarly, other post-processing methods use lexicons to verify word results or recognition results may be verified interactively with the user. Additional methods to correct or prevent errors using contextual knowledge are state-of-the-art and should appear in commercial systems shortly.
- **Output interface**: The output interface allows character recognition results to be electronically transferred into the domain that uses the results. For example, many commercial systems allow recognition results to be placed directly into spreadsheets, databases, and word processors. Other commercial systems use recognition results directly in further automated processing and when the processing is completed, the recognition results are discarded. In any event, the output interface,

while simple, is vital to the commercial success of OCR systems because it communicates results to the world outside of the OCR system.

7.3.3.3 Factors affecting OCR accuracy

An accuracy rate exceeding 98% is often cited as necessary for document conversion (OCR) to be more efficient than re-keying. The accuracy rate is determined by the number of edits required (insertions, deletions, substitutions) expressed as a percentage of the number of characters in the image. High accuracy rates have proven perennially difficult to achieve for certain types of library material including catalogue cards, multi-lingual texts, and historical items with faded type or unusual fonts. Accuracy can be affected by a number of factors:

- **Hardware and software variables:** such as scanner quality; recognition method and algorithm; font type and word glossaries.
- **Scan resolution:** The number of dots per inch can affect the clarity of the image and accuracy of OCR. Recent tests found that reducing from 300 dpi to 200 dpi increased the OCR error rate for a complex document by 75%; on the other hand, increasing from 300 to 400 dpi had negligible impact on OCR accuracy.
- **Generation of original:** Second generation scans, such as from photocopies or microforms, will reflect quality factors that affected the first-generation copy as well as the second-generation copy. These factors may include resolution, condition, accuracy, completeness and legibility.
- **Binding of original:** Inadequate gutter margins will distort the text on a typical flatbed scanner. Book cradle-scanners ensure better image capture while preserving bindings.
- **Paper quality/typeface clarity:** Broken characters resulting from pale type, and filled or touching characters stemming from excess ink or paper degradation, may not be recognised. Stains or marks on the paper will be captured on the bitmapped image, and OCR may try to interpret these as characters. For example, specks may be mistaken for accents. Inadequate contrast between text and background, such as with shaded or coloured backgrounds.
- **Typographical and formatting complexities:** Variations in typeface (e.g., bold, italics) or font size may be lost or introduced, or result in “misunderstood” characters. Unusual fonts or characters, such as mathematical symbols and sub- and superscripts, may not be recognised by the software’s repertoire of fonts. Handwriting is unrecognisable by standard OCR software. Cross-column headings, tables, indented text, footnotes, headers, text wrapped around images, and margin notes can all present problems to the presentation of the resulting text unless the scanned image has been zoned (i.e., text blocks and order delineated manually) before OCR occurs.
- **Linguistic complexities:** Misapplication of lexicons or mixing character sets, e.g., when more than one language dictionary is loaded. The character sets of certain languages might not be supported.

7.3.4 Video

7.3.4.1 General explanations

In the video domain it is desirable to have full-screen, full motion video straight form the video source, but this would require a data-stream with a bandwidth of 27Mbps, which is significantly higher than most PCs can handle.

7.3.4.2 Stages in video digitising

- **Select the footage to be digitised:** The first step in the editing process is to convert the footage into digital form and record them into the computer.
- **Select a video compression rate:** When a video is converted from analogue to digital form, it is compressed. Compression allows the computer to reduce the amount of information that is stored in digital form. By varying the image quality (resolution, colour versus black and white), frame rate, audio quality, and size of the video window (half or full screen), a given amount of footage will take more or less storage space. A high resolution, colour, full screen image stored at 30 frames per

second requires maximum storage capacity. The same material stored as a low-resolution, black and white, partial-screen image at a slower frame rate requires less storage capacity.

- **Digitise shot by shot:** The software or the digitiser allows for the in and out points of each of the clip to be digitised to be marked.
- **Trim each digitised clip to its actual in and out point:** To facilitate the editing process, each clip is digitised with extra frames at the beginning and at the end. The best fit of each clip is obtained by trimming the extra frames.
- **Use the timeline to arrange the shots in the proper sequence:** The computer's mouse is used to "drag" and "drop" the shots into the timeline at the appropriate place, and the shots can be easily moved elsewhere if the sequence need to be changed. This is one of the most powerful advantages of the non-linear editing systems. The order of shots can be changed without reediting the entire piece.
- **Add transitions between shots:** There are quite a few special effect transitions to choose from, but these effects are used sparingly in instructional programs.
- **Add graphics:** Titles of the program and other graphics can be created electronically within the editing program and incorporated into the project.
- **Add music and sound effects:** The sound attached to the picture is assembled into the timeline as the pictures are edited. Most programs allow the addition of several tracks of audio, and will use four or more tracks (voice, natural sound, stereo music, sound effects, and so on).
- **Allow the system time to render the special effects and transition:** Rendering is a process in which the computer creates special effects and transitions frame by frame. Some systems are capable of replaying the edited sequence with its special effects and transitions in real time; others need time (sometimes a significant amount of time) to render each effect and transition. Depending on the complexity of the effects and transitions involved, the process may take hours to complete.
- **View the edited project in real time to judge its effectiveness and acceptability:** Although the complete program can be viewed from the timeline, its final or true version is obtained only after rendering is done.

7.3.4.3 Basic problems with digital video

There are three basic problems with digital video: size of video window, frame rate, quality of image. It is not difficult to deal with these three problems and, although we will now take a look at these issues one at a time, they are by no means independent of one another. All of these issues can be tackled using compression techniques.

- **Size of video window:** Digital video stores a lot of information about each pixel in each image or frame. It takes time to display those pixels on your computer screen. If the window size is small, then the time taken to draw the pixels is less. If the window size is large, there may not be enough time to display the image or single frame before its time to start the next one. Remember, we need to draw 25 frames per second. There are several ways to solve this problem:
  - Choose an appropriate window size. It is often not necessary to have full screen video; small window sizes may be perfectly adequate for your needs, especially as with multimedia applications, there are other objects that need to be on screen at the same time. Viewing video on computer screens is not the same as watching video on television. Users will be close to the screen; in some cases a window size of 160 x 120 for a screen set to a 640 x 480 display is adequate (Hamilton et al., 1995).
  - The reduction of the window size to anything less than the size or resolution of the original video source (in the case of the European video standard, PAL, this is 576 horizontal lines) will involve some sort of compression. This is because the same information is being represented but in less space. Reducing the window size may not always, therefore, produce desirable results and will depend upon the content of the video.
  - Fast hard discs are now available enabling each frame to be read from the disc faster

- Use hardware accelerated playback. The graphic display cards now being supplied with PCs, more often than not included facilities for Windows acceleration and video playback.
    - **Frame Rates:** The issues here are similar to those above - too many pixels and not enough time. There is not enough time to move the data from hard disc or CD to screen. One way to overcome this is to compress the data so that less data is transferred from disc to screen. Depending on the size of video window chosen, you may also be able to reduce file size by reducing the number of frames per second to, for example, 12 frames per second. At smaller window sizes, e.g. 160 x 120 pixels, video played at reduced frame rates is, in the majority of cases, acceptable. At larger window sizes, the video can sometimes appear jerky.
    - **Image Quality:** The image quality will depend on the quality of the original source and the degree of compression used. During compression you will probably be asked to select a quality setting. This will be represented by an arbitrary scale of, 0-100%, 1-5, etc. A lower setting will result in greater compression and smaller file sizes but the quality of the resulting video sequence will be reduced.

7.3.5 Audio

7.3.5.1 General explanations

Although sound archives and music libraries should not even think about to select any perceptual (lousy) coded sound format as an internal archive standard, they certainly will have to deal quite a lot with many sound documents encoded in different industry audio compression schemes. Archives and libraries should therefore be prepared to read all formats on which relevant content will be stored as well as they could provide a user service to convert non-standard formats into generally readable ones. Today audio formats are dictated by the music contents the consumer appreciates rather than by technical quality criteria which would support technically optimised solutions at reasonable costs: A list of audio coders and links to useful pages on this issue always is incomplete at that point in time it would be written (for further information see Section 6 of this deliverable and among others.

7.3.5.2 Digitising Procedure Quality Control

Real time sound analysis of the analogue and digitised audio stream is performed during digitising in order to control the analogue to digital conversion process. For this reason, digital audio workstations provide several useful features such as:

- automatic detection of start and end position of the audio signal
- automatic detection of pauses during the recording
- automatic detection of the noise floor level
- automatic detection of clicks and impulsive distortions
- automatic detection of analogue media drop-outs
- average value of signal to noise ratio of the audio signal
- average value of frequency bandwidth of the signal
- average value of stereo correlation
- average value of level dynamics

Signal parameters extracted by means of digital signal processing as listed above are used to control the sound quality of the digitised waveform. Any errors occurring during digitising of analogue recordings should be detected on the fly. Standard quality criteria, obtained from long term statistics are matched against actual values measured. A transfer (quality) protocol is usually added to the technical metadata set.

7.3.5.3 Common Digital Audio File Formats

- **MPEG:** MPEG is a file format that offers good quality and compression. The MP3 (MPEG-1 layer III. Currently the best data-reduced audio format available) format is a type of MPEG compression that offers near-CD quality audio that uses about 10% of the storage space of a CD-Audio file. MPEG is actually a video format, but is used widely for audio-only "movies". It is getting a lot of press lately because high quality recordings can easily be distributed over the World Wide Web.
- **RM:** These are RealAudio file extensions. Real Audio is a common internet audio and video format, which supports streaming and live web casts. This is one format for streaming audio that is used by Real Networks. FM-radio quality is available at modem speeds, but the purpose of these files is not of the same quality as in case of large files or do live broadcasting. These files are heavily compressed.
- **WMA – Windows Media Audio:** This audio file compression format is similar to MP3 (developed by Microsoft), offering essentially the same audio quality as MP3, but at smaller file sizes, up to 50 percent less. It also incorporates DRM (Digital Rights Management) to combat music piracy.

Today, there are two groups of audio software:

- Audio players, which enable your computer to read audio files and translate them into music; manage play lists; and customise those play lists' look and feel using different skins.
- Jukeboxes, which combine an audio player's functions with the capability to encode, or record, audio files in several formats, including MPEG-3 (MP3), Windows Media Audio (WMA) and WAV.

8 Steps and modules in the digitising process

These steps are basic building blocks for the digitising of objects. Depending on the actual situation in a company they have to be modified.

Analysis and Selection	
Starting point	- Constitution of project group - Definition of goals

Analysis of collection	- Scope of collection:
	  - Quality (kind of artwork, kind of media)
	  - Quantity (number of items)
	  - material
	  - Status of cataloguing
	  - Readiness for digitising

Administrative matters	- Restrictions/copyright aspects - Decisions about collaboration with externals - Internal contracting
Approach	
Metadata formats	- CDWA (Categories for the Description of Works of Art - Dublin Core Metadata Element Set - Cataloguing standards (MARC)
Data formats	- Picture (*.tiff, *.jpg) - Text (*.doc, *rtf) - Audio (*.wav, *.mid, *.mp3) - Video (*.mpg)

Technical requirements	- Hardware (scanner, digital camera, computing equipment and framework) - Software (PHOTOSHOP, OCR, image view, storage and cataloguing software)
Repository requirements	- Naming assignment - Filing assignment - Copyright
Standards	- Chrome channels - Digitising quality (low, medium, high resolution) - Watermarking (Dig marc)
Processes of Production	
Development of work plan	- Determining objects and order of digitising - Determining methods and resources (formats, tools, persons to be involved - Determining repository requirements - Time and cost calculation

Production of digital collection (Scanning)	- Processes (intern/extern):
	  - Preparation of items
	  - Image capture
	  - Scan collection
	  - Image naming
	  - Process scanned images
	  - Review images for quality
	  - Co-ordinate rework

Additional /Post-Production	
Store in digital archive	- Cataloguing / indexing of images - Storage and backup
Additional Productions	- Production of Fragments - Working on Themes
Connection with REGNET	- Uploading data into REGNET Cultural Service Centres

Table 23: Steps in the digitising process

9 Tools & Configuration

After providing the theoretical framework of digitising the following chapter gives a broader introduction into tools, programs and standards for every digitising model described above to provide recommendations. These matters are both state-of-the-art as well as accepted in a broad range of applications. Due to different experiences within single digitising models the amount of described matters is varying.

9.1 Overview on recommendations for the framework

Type of digitising	*Objects*	*Standards*	*Tools*
Textual description	real objects (artefacts, maps, ...); bibliographic objects (books, ...); media objects (films, ...); archival objects (files, ...)	XML	XML Spy
2D surrogates	real objects ; bibliographic objects; media objects (photographs, ...); archival objects; card catalogues	JPEG	Photo camera, scanner, Adobe Photoshop 5.0 or higher
3D surrogates	real objects	VRML	3D-scanner, VRML-Tools: Internet Space Builder, 3D Studio Max 3, SPAZZ 3D
Electronic texts	images of bibliographic objects images of card catalogues	image formats (*.jpg, *.gif, *.bmp, *.tiff), text documents (*.doc, *.rtf)	OCR software (Recognita 5.0, Fine Reader 5.0, Readiris Pro 6.0,
Audio/visual material	audio tapes, films, video		digitising audio: Sound Forge 5.0, Cakewalk Pyro digitising audio-visual: Adobe Premier 6.0
Recognition of image / video contents	Digital images, video	MPEG 4	

Table 24: Recommendations of the framework

9.2 Textual description

- **Tool**: XML SPY (www.xmlspy.com)

XML SPY offers a comprehensive and easy to use product family to facilitate all aspects of Advanced XML Applications. The main feature of the XML SPY is the Powerful XML Editor that supports the XSLT Edit and Transform, Graphical Schema Design and Database Connectivity. The main aspect of the XML SPY is to develop the XML files that will contain the metadata for the information.

9.3 2D surrogates of originals

- **Purpose:** Create digital **2D images** of objects
- **Standards:** JPEG format
- **Tools:** Photo camera, Scanner, Adobe PhotoShop 5.0 or higher.

  Adobe PhotoShop (http://www.adobe.com/products/photoshop/). Adobe PhotoShop is the world-standard image editing solution. Adobe® PhotoShop® 6.0 software introduces the next generation of image editing with powerful new features that offer something for every user. Delivering the broadest and most productive toolkit available, PhotoShop helps you explore

your creativity, work at peak efficiency, and achieve the highest quality results across all media.

- **Methods:**

1. Use a conventional photo camera, print the negatives of the photos, scan the photographs with high resolution 200 – 300 dpi, and store the photos in JPEG format. The user is able to process the image with the Adobe PhotoShop software. The images must be stored in the hard disk and in CDs.
2. Usage of a digital photo camera, store the photos in JPEG format and in the maximum resolution that the digital photo camera supports. The user is able to process the image with the Adobe PhotoShop software. The images must be stored in the hard disk and in CDs.

9.4 3D surrogates of originals

- **Purpose:** produce digital 3D models of objects
- **Method:**
- VRML stands for Virtual Reality Modelling Language. VRML neither requires nor preludes immersion. VRML was designed to create a more "friendly" environment for the World Wide Web. It provides the technology that integrates three dimensions, two dimensions, text, and multimedia into a coherent model. When these media types are combined with scripting languages and Internet capabilities, an entirely new genre of interactive applications are possible. (www.web3d.org) The digitising of real objects can be achieved using various technologies. There are different methods for achieving the digitising of real objects. The most common used methods are either the use of a 3D scanner or the use of software that can generate 3D models from 2D photographs.
- 3D Scanners: Using a scanner has proven to be the most efficient way in order to produce good quality 3D objects from real objects. However, the cost of obtaining a 3D scanner is high and the time and effort required to produce the desired results depends on various parameters. These are as follows.
- lighting conditions of the environment
- colouring of the scanned object, transparent areas
- size of the object
- shape complexity in three dimensions
- hidden curvatures

For the REGNET project the Minolta VIVID 700 3D laser scanner (http://www.minolta3d.com) can be used. This scanner transmits laser beams to the real object and forms a 3D-point set of the object. Then the manipulation of the capture data takes place. This can be achieved by using the specialized software that comes with this laser scanner. The data from the scanned object can be exported in a variety of formats, making possible extensive post-processing of the resulting 3D models in other software like 3DSmax, Light wave, Rhino 3D and all major CAD/CAM software (ProE, CATIA, etc.).

For using 2D images to create 3D models there are several companies that have produced software that allows the creation of 3D models from photographs. For the purpose of the REGNET project, two software packages are can be used. Image Modeller from REALVIZ (www.realviz.com) and Soft face 3D by EPTRON (www.eptron.es). The concept behind these tools is best stated as follows. Find an object in the real world that is needed to become a 3D copy, take a lot of photos of it from various different angles, mark a few common points to let the program figure out where the cameras are positioned in 3D space and then the computer will produce a fully textured model ready to be used in a 3D package. This happens in theory. In practice, however, this process is more complicated than it seems. Usually if it is required to create a complex 3D object from photos, it is most likely that hundreds of points will be needed to be marked out on multiple photographs to produce a decent mesh.

To summarize these techniques will enable to produce some efficient low-polygon models of real-world objects. However, the amount of time required to achieve the desired results is a major drawback.

- VRML Tools:

1. Internet Space Builder
   - Company: Parallel Graphics (www.parallelgraphics.com)
   - Product: Internet Space Builder
   - Cost: $78
   - Authoring Platform: Windows 95/98/NT
   - Delivery Platform: VRML browser
   - Description: Internet Space Builder (ISB) is a wonderfully easy-to-use tool that enables you to build 3D VRML worlds and upload them to the Internet, where they can be viewed with any VRML 2.0 browser. Using an intuitive point, click, and drag interface, you can unleash your creative potential on an unsuspecting world. You can build anything from a fantasy city to an accurate rendition of your own bedroom. ISB includes a library of textures and objects, and the comprehensive documentation offers detailed information on making your own. You can import files from programs including AutoCAD and 3D Studio and incorporate music, movies, and hyperlinks. ISB can quickly upload your creation to sites that support Microsoft's Web Publishing Wizard, or package it ready to upload manually
2. 3D Studio Max 3 - Useful Tools in MAX for Making VRML. MAX will export many of its animation and modelling capabilities to VRML so it is full of useful tools. 3D Studio Max is one of the most powerful 3D graphic tools available in the market. It can be used for production of VRML worlds and one of the most important aspects is that it can produce high quality VRML animations. On the other hand when creating a VRML world using Max, keep in mind that the worlds produced in Max can sometimes be too large in size file and this will result in a VRML world slow and difficult to interact to.
3. SPAZZ 3D
   - Company: Virtock Technologies Inc. Parallel Graphics (www.spazz3D.com)
   - Product: SPAZZ 3D
   - Cost: $100
   - Authoring Platform: Windows 95/98/NT
   - Delivery Platform: VRML browser
   - Description: The objective of this application is to provide an easy way to create 3-D interactive environments. The environments can be viewed and experienced in Spazz3D, or in a VRML Browser, such as Blaxxun, a standard Browser plug-in and in Shout3D, a java applet. They can be displayed in the Spazz3D Screen Saver. Not only can you create static 3-D geometry, but also you can animate the geometry, add light and sound, and define the rules of interactivity in the VRML world.

9.5 Electronic texts

- **Purpose:** Produce digital texts with OCR Software
- **Standards:** Image formats (JPEG, GIF, BMP, TIFF) and text documents (doc, rtf)
- **Tools:** OCR Software

1. Recognita 5.0: Recognita Plus 5.0 provides essential help in turning printed documents into computer editable text. It makes it easy to process books, newspapers, colour magazines, business reports, tables and other printed papers, eliminating the tiresome retyping. New Recognita Plus 5.0 is the ultimate text recognition solution for those who work with multi-lingual

documents written in languages from Eastern Europe and in the Cyrillic alphabets. The program supports the West European languages as well. Its new OCR engine combines Caere`s and Recognita`s technologies to provide unparalleled OCR accuracy, which can reach 100% on laser printed documents. The program lets you process a wide range of documents, even poorer quality ones and those with text printed on grey or colour backgrounds. In addition colour magazines and brochures can be scanned and recognized - Recognita Plus 5.0 can embed the colour images in the recognized text. Its enhanced saving option lets you save the text in the formats of the latest word processing and spreadsheet applications in MS Office 97/2000.

- System Requirements :
  - Windows 95, 98, Windows NT 4.0 or Windows 2000
  - IBM compatible PC with Intel Pentium or equivalent processor
  - 8 MB RAM for Windows 95, 98 (16 MB recommended), 16 MB for Windows NT 4.0, Windows 2000 (32 MB recommended) plus 35 to 45 MB free space on hard disk
  - Supported 300/400 dpi flatbed or sheet-feed scanner. TWAIN interface is supported.
  - SVGA or VGA monitor (preferably with more than 256 colour support for handling colour images)
  - Mouse or other pointing device recommended
  - CD-ROM drive

2. Fine Reader Professional 5.0 OFFICE (http://www.abbyy.com/products/fine/) The Fine Reader Professional 5.0 OFFICE is designed for work in the office. The Office version is specially designed for work in a network.

- Software and Hardware Requirements
  - PC with Intel® Pentium® 133 MHz or higher processor
  - Microsoft® Windows® 95, 98, ME, 2000, NT 4.0 (with Service Pack 3 or greater)
  - 32 Mb RAM, plus 16 Mb RAM for each additional processor (on a multiprocessor system): 40 Mb of free hard-disk space for minimal program installation, 50 Mb of free hard-disk space for program operation
  - Microsoft® Internet Explorer 4.0 or higher (Microsoft® Internet Explorer 5.01 is included)
  - 100% Twain-compatible scanner, digital camera or fax-modem
  - VGA or other high-resolution monitor
  - CD-ROM drive and 3.5" floppy drive
  - Mouse or other pointing device

3. Read iris Pro 6.0 (http://www.irislink.com/UK/Products/readiris.html) Read iris Pro 6 is a powerful and very easy-to-use OCR (text recognition) software that converts your every-day printed documents such as letters, faxes, magazine articles, columns in a newspaper, etc. into editable text files with a very high rate of recognition accuracy. Choose any document**:** black & white, colour, complex, text/tables, and any font in any style. Scan single or multi-page documents with ANY scanner. Recognise with *Read iris Pro*; send your results automatically in Word, Excel or save them into the most popular output formats including HTML.

- System Requirements
  - Windows: 486 based Intel PC. minimum: 16 MB RAM, 65 MB free hard-disk space, and CD-ROM drive for installation. Read iris Pro runs on Windows 95/98/ME and Windows NT/2000
  - MacOS: MacOS computer with a PowerPC processor, minimum: 22 MB RAM. 32 MB free RAM to process "true colour". 25 MB free hard-disk space, CD-ROM drive for installation.

Runs on MacOS 7.6 with QuickTime 3.0 and Appearance 1.0.1 installed, MacOS 8.5 with QuickTime 4.0 installed, MacOS 9.

9.6 Electronic video, audio

Software Tools for digitising audio material:

- Sound Forge® 5.0: (http://www.sonicfoundry.com/products/NewShowProduct.asp?PID=426). Sound Forge is Sonic Foundry's award-winning two-track digital audio editor. Sound Forge includes a powerful set of audio processes, tools, and effects for manipulating audio. This one-of-a-kind application is perfect for audio editing, audio recording, effects processing and media encoding. Combine Sound Forge with any Windows-compatible sound card to create, record, and edit audio files. The clean and familiar Windows interface makes editing a breeze. It also has built-in support for video and CD burning and can save to a number of audio and video file formats, including WAV, WMA, RM, AVI, and MP3.
- Cakewalk Pyro (http://www.cakewalk.com/Products/PY/PY.html) Cakewalk Pyro allows you to record, play and organize your favourite digital music. It will burn CDs, rip songs from your CDs, LPs and cassettes into MP3 or WAV files, or just play your favourite songs on your PC. From there, listen to your music on your PC, export to portable MP3 players such as RIO and NOMAD, or make a custom CD. It uses Environmental Sound Processing (ESP), which optimises the sound of your digital music in any environment you choose and is compatible with many industry CD-R and CD-RW record able drives. It also integrates with CDDB Internet music database for downloads of song titles and artist info for commercial CDs. Fast Forward Tutorials provide detailed help, tips, and tricks for becoming an expert on digital music.

Software Tools for digitising audiovisual material:

- Adobe Premiere 6.0 (https://www.adobe.com/products/premiere) Adobe® Premiere® 6.0, a stunningly simple and powerful professional video editing tool, comfortably closes the DV to Web gap while extending the award-winning software's position as the most accessible application on the market today. With new support for DV on the Windows platform and cross-platform support for all of the leading Web video formats, Premiere aggressively integrates a variety of features and functions into its long-held marketplace position as simply the best video editing tool around.
    - Hardware compatibility: Capture and output of video in Adobe® Premiere® 6.0 requires either an Adobe-certified third-party capture card or an IEEE 1394 interface (Fire Wire or iLink) compatible with either DirectX (Windows) or QuickTime (Mac OS). For a third-party capture card to be deemed Adobe-certified, Adobe Premiere Quality Engineering must test and approve the card for use with a specific version of Premiere using specific versions of driver software created by the card manufacturer. Because built-in DV support in Premiere 6.0 is implemented through DirectX or QuickTime, Premiere requires either a Microsoft DirectX-compatible or Apple QuickTime-compatible IEEE 1394 interface. An IEEE 1394 interface is built-in to many computers and is also available separately as an add-on card. For details about our built-in DV support, see Built-in IEEE 1394 compatibility (below). Adobe Premiere Quality Engineering has tested DV-1394 cameras and decks for compatibility with Adobe Premiere. Since there are so many makes and models of devices, they have selected a handful of the most popular of several brands. Check the Device Compatibility List for Premiere 6.0 for details about the degree to which each is supported. Third-party capture card certification: Premiere 6.0- Although some cards may be certified for Premiere 5.1c, it may not necessarily be certified for Premiere 6.0. Many cards are in the process of being tested with Premiere 6.0. Check Certified third-party capture cards for the current list of Premiere 6.0 certified cards. Check Unsupported third-party capture cards for a list of cards which are currently unsupported by Premiere 6.0. Built-in IEEE 1394 compatibility
        - Windows: Any IEEE 1394 interface identified as OHCI-compatible or OHCI-compliant will work with Premiere 6.0. The following is required for compatibility: Microsoft® Windows® 2000, Windows 98 Second Edition, or Windows Millennium Edition, Microsoft DirectX-compatible video display adaptor, Microsoft DirectX-compatible IEEE 1394 interface (Choose 1394 Controller from the pop-up menu at http://www.microsoft.com/hcl/ to view compatibility testing results.)

- MacOS: The following is required for compatibility: Mac OS software version 9.0.4, Apple QuickTime™ 4.1.2, Apple Fire Wire 2.4 or later, QuickTime-compatible Fire Wire (IEEE 1394) interface (Fire Wire ports are built-in to many Macintosh computers and are also available as add-on cards.)

9.7 Automatic recognition of image/video contents

It was not possible to find a software dedicated for the specific process. However it is possible to store extra information in an image or in a video. This can be done using the MPEG-4 standard.

MPEG-4 allows attaching information to objects about their content. Users of the standard can use this 'OCI' (Object Content Information) data stream to send textual information along with MPEG-4 content. It is also possible to classify content according to pre-defined tables, which will be defined outside of MPEG. Further possibilities are giving unique labels to content, and storing camera parameters.

More info http://www.cselt.it/mpeg/standards/mpeg-4/mpeg-4.htm

Available tools that support the MPEG-4 standard may be found on the following url: http://www-elec.enst.fr/~dufourd/mpeg-4/

10 System and content recommendations

10.1 General recommendations

It is important to plan digitising projects with a goal of long-term access to the material and to see the expected result with the eyes of (potential) users. So it is useful to scan at the highest quality without compression because of the difference between masters and delivery files. Due to the different institutions within REGNET standardization matters are very important both on the side of metadata as well as file naming and formatting.

10.2 Image recommendations from ALI

Image recommendation		
Format	jpeg compression	
Resolution	Thumbnails	128x128 pixel
	low resolution	256x256 pixel
	low-medium resolution	480x480 pixel
	medium resolution	800x800 pixel
Chrome channels	RGB	
Watermarking	Dig marc technology	

Table 25: Image recommendations of ALI

Software recommendation	
Tools	digital watermarking by Digital Copyright Technologies (Dig marc)
Image retouch	Photoshop 6
Image viewing	ACD See
Some specific tools are needed for the management of images	

Table 26: Software recommendations of ALI

10.2.1 Image reproduction

High quality reproductions are needed as any step in the process involves losses.

The reproductions of sculptures and 3D objects will need different number of shots referring afterwards to the same record.

The process will need different technology for different outputs or different volume of data/time:

a) digital camera: high volume of images/time but exchange of the personnel if strong lighting is used (flashlights).

b) traditional photo followed by digitising the film: lower volume of images/time but high level of technology and know how and skill of the personnel. Having the negatives has great importance in the case of digitising again some set of objects.

10.2.2 Image naming and storage

The naming of image files is of great importance: you should take into account:

a) Possible volume of total images.

b) Clear referring to the subset of objects.

c) Unique ID.

d) Alphanumeric choice is good.

e) The names of files shouldn't be too long : some O.S. do not manage long names (i.e. MS-DOS).

f) The same image has usually different formats of resolution, so the name should be unique if referred to that specific resolution.

g) Backup files are vital.

The large amount of memory required to store the images must be considered (each image could need from 2.6MB if b/w to 18MB if colour image). You must take in account even the copies of the same image produced as thumbnail or as medium resolution.

10.2.3 Image processing

Some post processing actions are needed in order to:

a) Correct dust, scratches, distortions, fingerprints,…

b) Colour corrections (colour channel management).

c) ICC profile

d) File format and compression rate.

e) Thumbnail generating

f) Watermarking.

g) Some tools are needed to monitor the database of images

10.3 Process recommendations provided by Museon (MUS)

Before starting any digitising process it is necessary to establish the urgency of the digitising request, the quality of the digital image needed, the complexity of the objects regarding their photographical aspects (e.g. highly shining object or paintings are more difficult to photograph than other objects), the fragility of the objects concerned, the internal facilities present in the organisation and the claims on these facilities made by others in reference to their priority.

10.3.1 Process calculations

Decisions about the process	
Determine use-type of digitised objects	a) Exhibition b) Web site c) Museum PR d) Internal publication e) External publication f) Restoration documentation g) Collection research project h) Collection management system
Determine digitising quality needed	a) Standard 72 dpi b) Up to A-4 130 dpi c) Higher quality
Determine urgency of digitising	a) Within one day – one week b) Within one month c) Within one year d) Long-term project
Object complexity	a) Standard (not highly glossy or extremely large, or microscopic) b) Complex: highly shining object, paintings etc.
Fragility	a) Normal b) Highly fragile
Internal facilities	a) None b) Photographer c) Analogue camera d) Digital camera simple e) Digital camera A-4 130 dpi f) Digital camera > A-4 130 dpi g) Scanner simple h) Scanner advanced i) Volunteer j) Analogue camera k) Scanner simple

Claims for other projects on organisation facilities	a) None b) Some c) All It is possible to construct a grid to accommodate all the factors mentioned here. It is better to keep these facets in mind and at the same time follow a general approach. One can determine a basic set of work flows: We presume that a museum has at least a basic set of facilities: simple digital camera, simple scanner.
External digitising	Factors contributing towards this procedure: • High digitising quality needed • Urgency is not high • Large quantities of digitised images needed E.g. Internal or external publications: posters or photos used in exhibitions or images (large numbers) used in the collection management system.
Internal digitising	Factors contributing towards this procedure: • Images needed quickly • Images needed of low or medium quality E.g. Images for web sites, restoration documentation, images for the collection management system.

Table 27: Process recommendations of MUS

The decisions about the described factors can be visualized as follows.

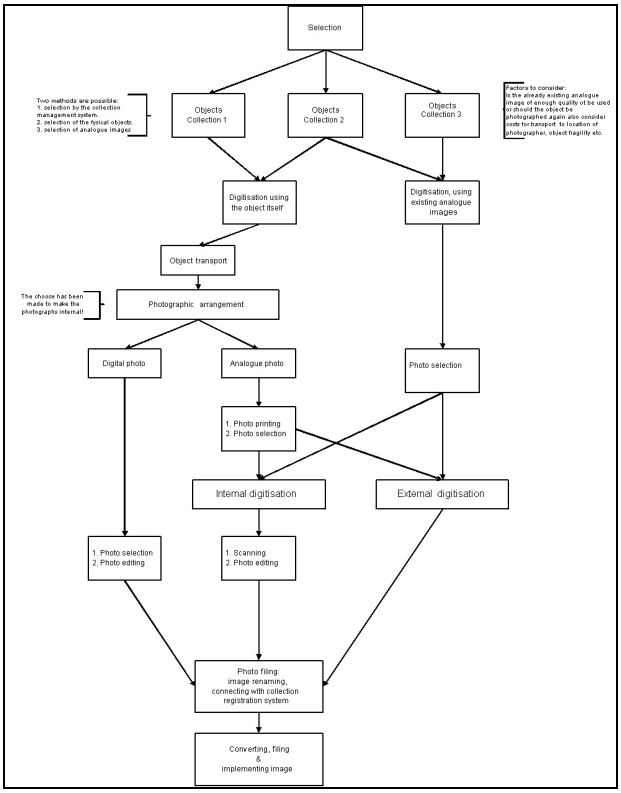


Figure 18: Recognition of image/video contents

10.3.2 Time calculations

Several institutes have made calculations regarding the time investment for each phase in a digitising process. Hereunder you can find some of the results. Source: SIMIN-bundle nr. 18, Author J. v.d. Starre. Care must be taken not to forget that a large object takes much more time and a complex object is more time consuming than a simple one. To be short: the durations mentioned are averages.

Activity	**Number of minutes per object**
Selection object collection	1,00
Selection object	4,00
Object transport	5,00
Photographic arrangement	5,00
Making digital photo	2,00
Photo selection	2,00
Photo editing	1,00
Photo filing	0,50
Photo conversion	0,50
Photo filing	0,50
TOTAL	**21,50**

Table 28: Time calculation for digital photography

Activity	**Number of minutes per object**
Selection object collection	1,00
Selection object	4,00
Object transport	5,00
Photographic arrangement	5,00
Making photo	2,00
Photo printing	9,50
Photo selection	2,00
Photo scanning	5,00
Photo editing	2.00
Photo filing	0,50
Photo conversion	0,50
Photo filing	0,50

TOTAL	**27,50**

Table 29: Time calculation for analogue photography

Activity	Number of minutes per object
Selection object collection	1,00
Selection object	4,00
Photo selecting	1,00
Photo scanning	5,00
Photo editing	2.00
Photo filing	0,50
Photo conversion	0,50
Photo filing	0,50
TOTAL	**14,50**

Table 30: Time calculation for existing analogue images

11 Best Practice

11.1 The “Digital Image Archive” of The Austrian National Library (ONB)

The study “DigiCult”, mandated by the European Commission and conducted by the independent experts of “Salzburg Research” (http://www.salzburgresearch.at) identified the digitising concept & process of the Austrian National Library as a leading example for digitising in the field of cultural heritage in Europe. The Austrian National Library therefore takes the liberty to present one of it’s own projects:

11.1.1 The project

The project "Digital Image Archive" of the Austrian National Library (sponsored by the Federal Ministry of Education, Science and Culture and the Austrian Industrial Research Promotion Fund) aims at restructuring the "Collection of Portraits, Picture Archive and Fidei Commissa Library", Austria's largest picture documentation centre. This division of the Austrian National Library holds more than 1.5 million pictures focussing on historical portraits, architecture, topography and history of Austria.

The project's main target is to create an efficient model for a "Digital Image Archive", which is based on the existing organisational structures of the collection. Traditional services shall be supplemented by new, digital services. Electronic image catalogues and presentations shall increase the availability of the objects of the collection for scientific as well as commercial usage.

For the Austrian National Library the "Digital Image Archive" project represents a decisive step towards cataloguing and stock exploitation of all kinds of pictured objects in all collections of the library. Digital services will open new opportunities of cooperation with the economy (publishing companies, printing trade and multimedia industry).

11.1.2 The basis: the typewritten card catalogue

The new digital image catalogue is based on the typewritten card catalogue (developed in the 1930s) of the Picture Archive of the Austrian National Library.
This card catalogue comprises a central catalogue of 1,110.782 cards and an additional catalogue of

96.568 cards listing localities of Vienna which are arranged according to both districts and motives. Further, a catalogue in book form of about 10.000 pages summarises comprehensive topics.

All cards of the card catalogue would amount to a length of about 291 meters.

The catalogue is built as a dictionary catalogue (combining author and subject heading catalogues). The cards can be divided in 3 types according to their function (header card, index card, pointer card) and in 3 categories according to their content (person, subject, and topography).

Example 1: header card (person)

1: main heading
2: profession
3: date of birth
4: date of death
5: persons' index code

Example 2: index card (subject)

1: first heading
2: second heading
3: legend
4: description
5: technique
6: signature mark

Example 3: pointer card (subject)

Example 4: header card (topography)

1: place name
2: federal province
3: district authority
4: geographical area codes

Example 5.: index card (topography)

5: classification scheme

11.1.3 Thorough analysis & the digitising of the card catalogue

More than 6 million catalogue cards of the Austrian National Library were digitised between 1998 and 1999 and a specific software was developed to make them available via the World Wide Web.

This software is called “KatZoom”. It was developed by Wilhelm Dikovich, a staff member of the Austrian National Library. “KatZoom” is based on the digitised card catalogue (*.gif) and structures the cards hierarchically according to their order in the alphabet. It enables the fast reproduction of

searchable card catalogues of any size in the Internet, once the card catalogue is digitised. The user can browse through the cards by first choosing the initial letter in which he/she wants to browse in and subsequently narrow the range of cards in which he is interested in. “Katzoom” is a very simple tool easily understood by any user. Some of Austrian National Library’s catalogues may still be consulted via “KatZoom” (http://katzoom.onb.ac.at/cgi-bin/katzoom/katzoom.pl?katalog=2 , http://katzoom.onb.ac.at/cgi-bin/katzoom/katzoom.pl?katalog=3).

A thorough analysis of the archive's structures led to the development of a concept for the Image Database. From August 1999 to October 1999 all catalogues of the Picture Archive were digitised.

11.1.4 The development of a cataloguing software & indexing

In co-operation with the Central Informatics Service of the Austrian National Library and based on the in-depth structural analysis of the card catalogue, a cataloguing software was developed, which enables the indexing of millions of catalogue cards via web-interface in very short time. After having started with preliminary analyses as soon as fall 1999, the indexing software was programmed in spring 2000 by Wilhelm Dikovich. On the 27th of March 2000, at 15:15 in the afternoon, the first catalogue record was created: (the island) "Oahu", card-picture no. 726246. The final decision concerning the input fields and their structures was taken on the 3rd of March 2000, and the developing of the software for the indexing process was finished by the 24th of March 2000.

The result is an extension of the "KatZoom" software, developed by the Austrian National Library for the electronic reproduction of card catalogues in the Internet. The extended solution "KatZoom plus" allows the creation of an index for the card catalogue, processed by automatic methods. In the case of the Picture Archive catalogue, an index was developed according to its documentary structure, dividing people, places and subject keywords.

In April 2000 an indexing team consisting of five people began with the indexation of the scanned integral catalogue. First, the type of card was determined for each new keyword appearing in the alphabetical order of the cards.

By a simple click on the corresponding card category the input mask was opened and the correct type of card was already marked. Then the input fields were filled in. In the case of persons, dates of birth and death were indexed in addition to names. Where topographies were concerned, area codes and classifications were indexed, too. This system of marking and dividing enabled an efficient processing of the cards for the import into the image database (separating header and index cards, creating a

topographical thesaurus as well as an index for people and subject keywords, and removing pointless pointer cards etc.).

After completing the form of the input mask, the indexing person would close the input mask window. As the index keywords would then be automatically attributed to the following cards, as long as no new index keyword was written into the input field of the input mask, not every single card but only the cards with different keywords had to be worked on. A second index level was built in where there were more than 400 index cards in a row.

During the input process, there was no automatic spell-check or any control, whether the cards were appearing in the right order. Misplaced or faulty cards were marked with special codes during the indexing process, which enabled a direct accession to the record in question in a correctional phase. These check-routines and protocols were performed during the night or at weekends.

The project team started indexing the Picture Archive catalogue (about 1.2 million catalogue records) at April 3rd, 2000. Everyone managed to increase the average daily indexing rate from about 800 cards per day to about 3500 cards per day. On August 10th, 2000 the indexing team celebrated the indexation of the one million catalogue card and on November 10th, 2000 all catalogues of the Picture Archive had been indexed, corrected and prepared for the import into the Image Database.

11.1.5 The installation of the Image Database

The selection committee of the Library's Directorate General elected STAR (online information: http://www.cuadra.com) as the new image database of the Austrian National Library. In addition to the library system ALEPH, STAR covers cataloguing, documentation and customer services for the collections of the Austrian National Library. It was installed at the Austrian National Library at the 13th of February 2001.

Subsequently, the database had to be adapted to the needs and data structures of the Picture Archive. This is where the STAR Software's flexibility (which was one of the main reasons why it was elected) proved to be a major asset.

11.1.6 Going online

On July 12th 2001 the Austrian National Library presented the new online version of the Picture Archive: http://www.bildarchiv.at . Its design and storyboard have been realised by the Internet- and Web Design Experts "Pixelwings Medien AG" in close co-operation with the Picture Archive of the Austrian National Library. It is a test version and aims at gaining first experiences in new communication forms and consumer relations. Even as a test version, it already attracted thousands of users and earned wide recognition among professionals.

One of the prize winning features of this web site is the fact, that the user actually furthers the indexation of the catalogue by ordering an item. As he orders a reproduction of a certain picture, he/she is prompted to fill in the signature of the specific picture, which can be read of the catalogue card. The signature of the picture was not indexed during the indexation phase, as it would have been too much time consuming and expensive. This way, the user contributes to the building up of information: not only concerning the signatures of pictures, but also concerning the items which are of the greatest interest for the users. The quality control consists in the ordering process: giving the wrong signatures automatically entails the reproduction of the wrong picture. As the filling in of this signature field is mandatory, every order is also a service rendered to the Picture Archive.

Besides the mandatory signature field, the user is also asked to help the Archive by copying the legend. This field is not mandatory. Still, it has been filled out by a small percentage of users.

11.1.7 Customised On-Demand Digitising for ONB via REGNET

(For a general work-flow of an On-demand Digitising Service see http://www.bodley.ox.ac.uk/scoping/ondd.pdf)

ONB has developed a web-based indexing system for converting and integrating card catalogues into image databases (for a detailed description see "Best Practice" provided by ONB in T 1.2). ONB will prepare data description in order to define data exchange between ONB retrieval system and REGNET Portal. ONB will also provide specifications for web-based searching and displaying search results of ONB catalogue data via REGNET Portal. The User will be able to search the complete ONB catalogue (1,1 million records) via REGNET and activating an on-demand digitising service. For a first version of the new ONB Image Digitising Service and image database see http://www.bildarchiv.at. A user interface for web based searching and ordering has been developed and put into service since July 2001.

ONB has also prepared Online-presentations of highlights of its collections which will be integrated into REGNET (first examples featuring Elisabeth, Empress of Austria and Highlights of ONB Collections see http://www.bildarchiv.at) . ONB will prepare ca 100 high quality images according to topic specifications of the REGNET content group for displaying and ordering in analogue or digital form.

ONB will provide also the infrastructure for archiving high resolution images and is prepared to act as a Service Centre.

Milestones foreseen:

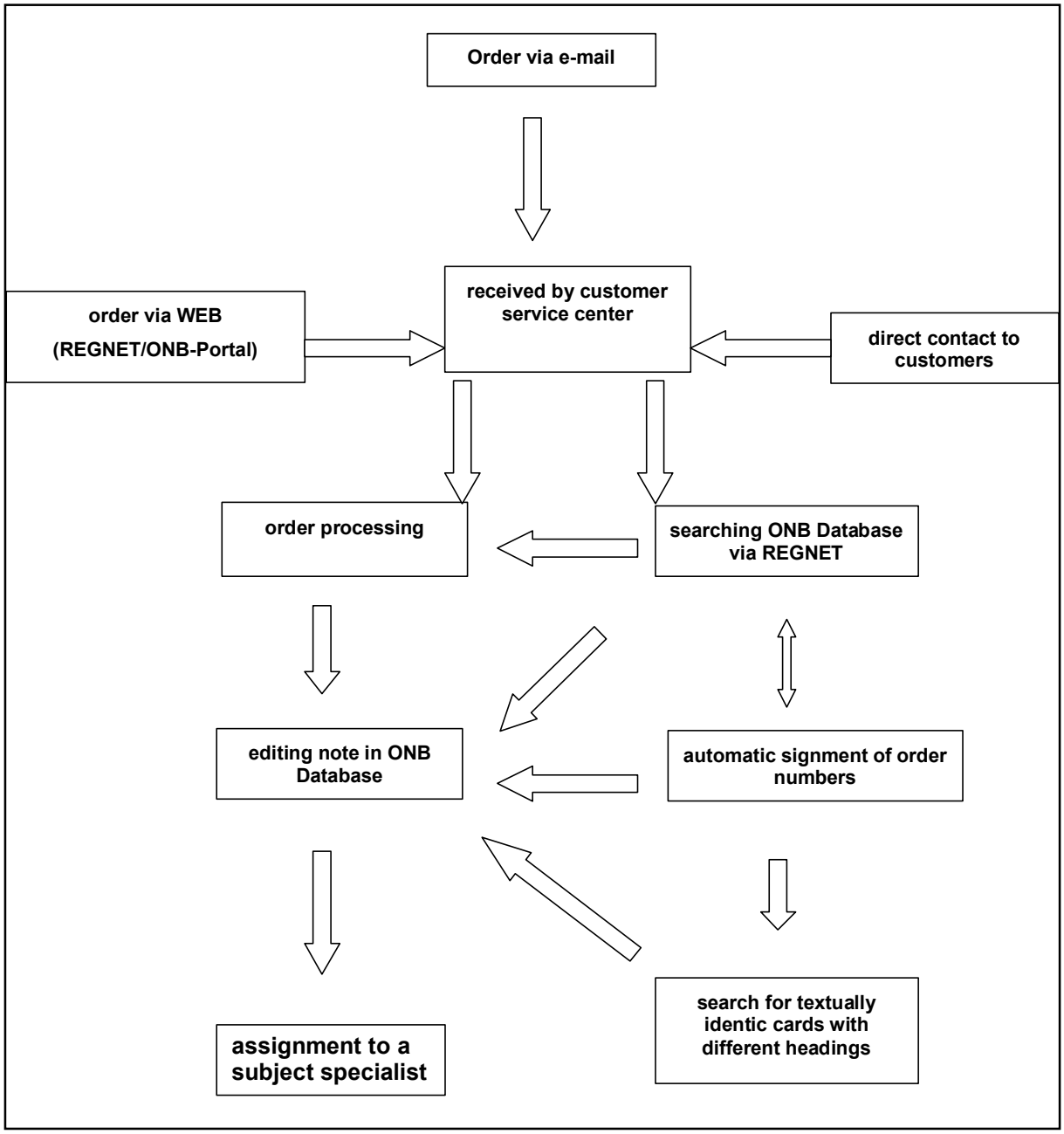
1. Define specifications for data exchange of ONB card catalogue with REGNET System
2. Preparing ON-demand digitising service via REGNET

3. Preparing 100 high quality images according to REGNET themes

Ordering process

The ordering process can be pictured as followed:

Figure 19: Ordering scheme for pictures



http://Finally the process continues as illustrated:

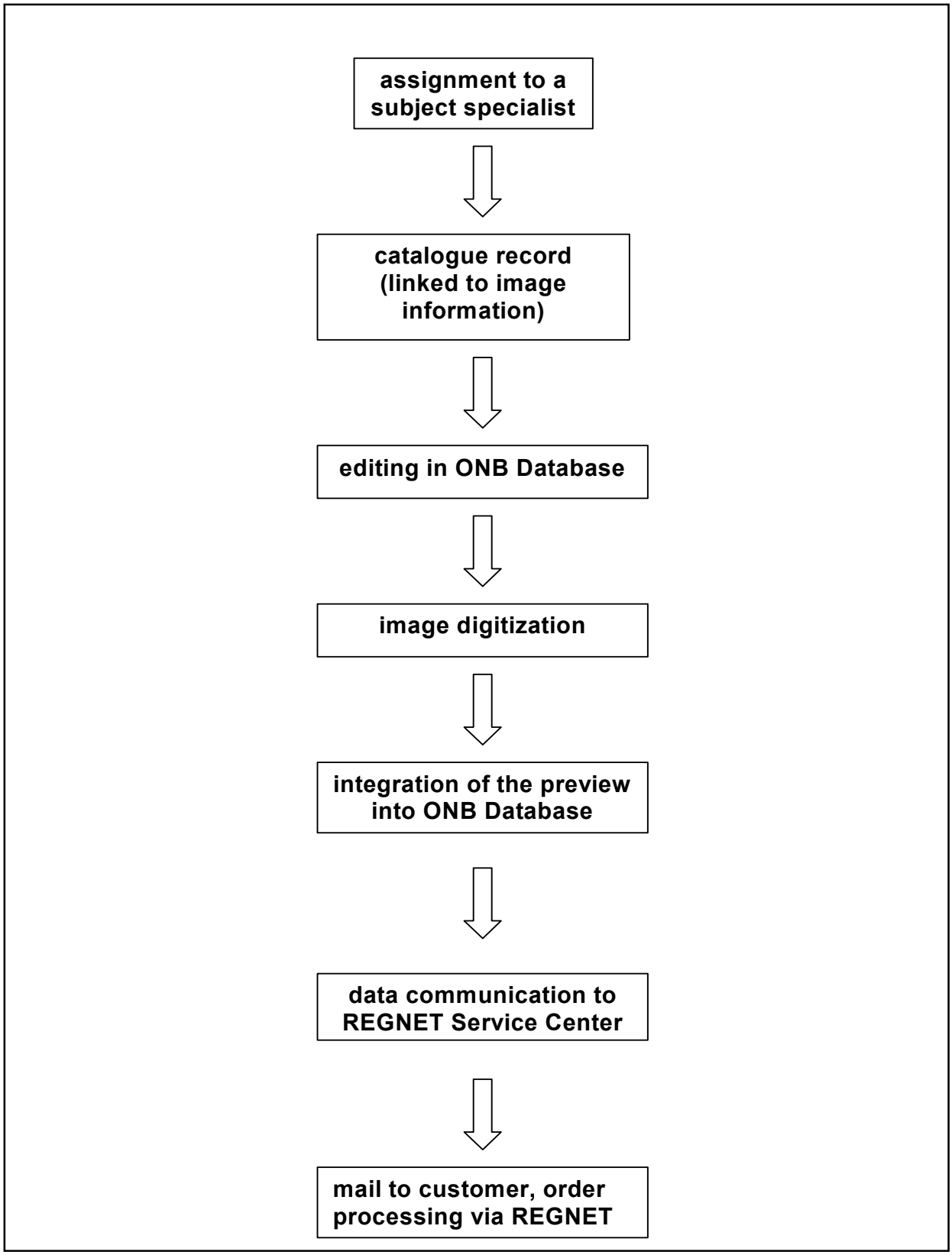


Figure 20: Ordering scheme for pictures (continuing)

12 Customised digitising plans

12.1 Lansmuseet pa Gotland (LMG)

Digitising Plan for Lansmuseet pa Gotland				
Lansmuseet pa Gotland (The County Museum of Gotland) is one of the largest museums, attracting most visitors in the country. The about 80000 objects in the collection reach from the Stone Age to the Viking Age, from the Medieval Period to present day. The Museum Shop has copies of objects from various fields of the museum´s collection. There are also copies of objects found on Gotland, that are now in The Museum of National Antiquities (SHM) in Stockholm. In the shop there are also traditional handicraft from the region, as well as books about the history, nature and culture of the region.				
A. Strategic Considerations				
Goals of digitising activities	1. Improve The Museum Shop´s web site (better photos, more information, translation to English) 2. Provide information of and access to objects in the collection (within the theme “Saints”)			
Use-type of digitised objects	1. Web site 2. Availability for research, educational aspects, CD-ROM with medieval wooden sculptures in the collection.			
B. Target Collection (description of the selected collection)				
Information about objects in the theme “Saints”. Our collection consists of several religious objects, mainly from the about 100 medieval churches on Gotland. Our goal within the theme ”Saints”, is to present medieval wooden sculptures in our collection.				
1. Quantity and Quality of selected collection				
Number of objects	60			
Object types	Real objects	Bibliographic objects	Media objects	Archival objects
	Medieval wooden sculptures	0	0	0
Themes	Saints			

Continuation

2. Status of cataloguing (for the selected collection)					
Short description	The museum catalogue is digitised in Super base*. The information has only been transferred directly from the original, hand-written, catalogue. The registration is mostly neither detailed nor consistent. *Super base is compatible with File maker pro, Excel and Access. We are planning to convert the catalogue to Access.				
Degree of cataloguing					
	None	Catalogue cards (paper-based)	Electronic descriptions	Digitised card catalogue	Others
				100 % Text - the digitised database catalogue needs to be worked up and modified, and information about the objects has to be added to the digitised database catalogue	
3. Readiness for & status of digitising					
	Photo – new digital photos in JPEG format are needed.				
Degree of digitising					
	None	Photo, negative	Digital (no management)	Digital (management)	other
	100%				

Continuation

C. The administrative framework					
1. Restrictions & Copyright issues					
	The photos will be protected by copyright, owner of copyright will be LMG. Photos are available in REGNET				
2. Internal & external facilities					
	We have all the equipment needed for the project as computers, digital cameras, scanners and software.				
	None	Internal			External
		Camera(s)	Scanner	Other(s)	
		Digital cameras	Flatbed scanner	CD-burner	
3. Comments on other relevant issues					
D. The digitising approach					
1. Digitising Model (Connection to REGNET System)					
	Complete new digitising	Migration of existing digitising	Co-existence between different systems	Other models	
		Yes, from main catalogue to new “Saints” – database.	Super base – MS Access		
2. Type of aimed digitising					
	Textual descriptions	Electronic Surrogates (2D-/3D-images)	Digital Texts	Digital audio/visual material	Additional productions (e.g. fragments,...)
	Describing texts	Digital images			Translations

				Continuation	
3. Configuration framework (Standards, Tools & other definition					
Textual description (bibliographic information)	Data fields (e. g. the usage of a standard like MARC, EAD, CDWA), own adaptations)		Tools (e. g. Existing collection management systems, editors, tools for the processing of scanned catalogue cards etc.)		Other remarks you found necessary to describe the production of textual descriptions
	Data fields of MS Access		Manually typing into MS Access Database		
Electronic surrogates (2D/3D images)	Naming & Filing (e. g. file formats *.jpg, *.gif)	Resolutions (in dpi)	Tools (photo camera, scanner, ...)	Software	Other (e. g. watermarking)
	*.jpg	300	scanner, dig camera	MS Office pro, Super base	
Digital texts	Naming & Filing (e. g. file formats *.doc, *.pdf)	Tools	Software (e. g. OCR software, text editor ...)	Other	
	.doc		MS Word		
Digital audio/visual material	Naming & Filing (e. g. file formats *.wav, *..wma)	Tools	Software (e. g. digital audio editors)	Other	
Additional productions	Naming & Filing	Tools	Software	Other	
	*.htm		Dream weaver		

Continuation

E. The digitising process	
1. Work plan & Work packages (necessary steps)	
	Steps and work packages needed: The Museum shop, 3,5 personal months 1. Research, our catalogue and the catalogue of The Museum of National Antiquities (SHM) in Stockholm 2. Adding new facts about the object to the web site 3. Digital photographing 4. Adjust and save the photo digitally 5. Translation to English Theme “Saints”, 3 personal months 1. Collect the objects 2. Check the registration in the catalogue 3. Research, literature and archive 4. Adding new facts about the object to the catalogue 5. Translate to English 6. Digital photographing 7. Adjust and save the photo digitally

	Continuation

2. Time Plan	
	Describe your time planning:
3. Personnel	
	Project Members and roles: SIG England, Computer supervisor Quatrain Steins, Curator

12.2 Kungliga Vetenskapsakademien (KVA)

Digitising Plan for KVA	
The Royal Swedish Academy of Sciences (Kungliga Vetenskapsakademien, KVA) was formed in 1739 by among others Carl Linnæus. Its aim was to promote practical utilities through the natural sciences. Promoting science is still the main activity of KVA, which it does in many ways, for example by awarding the Nobel Prizes in physics and chemistry.	
A. Strategic Considerations	
Goals of digitising activities	Provide information of and access to the collections of KVA in a convenient form to all audiences.
Use-type of digitised objects	1. Availability for research 2. Availability for the general public. Both through the REGNET System. Other aspects might be to provide basis information for exhibitions, web site, various publications, restoration documentation, collection research project, and collection management system.

Continuation

B. Target Collection (description of the selected collection)					
In the first instance a selection of items from the historical scientific instrument collection will be made dealing with the measurement theme. The selection aims at various aspects of measuring rather than to present ten meter rods, ten yard sticks, … Also items from the archive in connection with the Linnæus theme will be digitised. Also portrait collection of scientists.					
1. Quantity and Quality of selected collections					
Number of objects	450				
Object types	Real objects	Bibliographic objects	Media objects	Archival objects	
	100	0	300	50	
Themes	Measurement		Portraits	Linnæus	
2. Status of cataloguing (for the selected collection)					
Short description	The old scientific instrument collection is catalogued, both in an old card catalogue as well as in a database. The archival material is catalogued according to Swedish national registration rules (descriptions rather than databases). The portrait collection is partly digitised, but only with a rough indexing. There is a card catalogue of the portrait collection.				
Degree of cataloguing	None	Paper-based	Data bases, word processing	Catalogue management system	Digitised catalogue cards (no OCR treatment)
	67%	11%	22%	0	0
3. Readiness for & status of digitising					
Short description	The old scientific instrument collection is already digitised in an MS Access database consisting of 3,636 items. The database with 22 fields (not all completely necessary) originated in a Macintosh format only with digital black and white images database from the early 1990s. Since the PC technician responsible for the transfer claimed it impossible to maintain the pictures in the database when it was transferred to PC (NT) a great benefit of the database was lost. Most of these pictures are in low-resolution JPEG format, and might prove useful in a new attempt. The portrait collection is scanned in TIFF format in 350 dpi-resolution and in 36-bit colour. They are on CDs corresponding to the photo albums since the search goes through a card catalogue.				
Degree of digitising	None	Photo, negative	Digital (no management)	Digital (management)	
	11 %	22 %	67 %	0	

Continuation

C. The administrative framework					
1. Restrictions & Copyright issues					
	The copyright of the material is owned by the Royal Swedish Academy of Sciences.				
2. Internal & external facilities					
	None	Internal			External
		Camera(s)	Scanner	Other(s)	
		Consumer level digital camera	Consumer level flat bed, 2 A4 & 1 A3 scanners	CD burners	Only on temporary basis.
3. Comments on other relevant issues					

Continuation

D. The digitising approach					
1. Digitising Model (Connection to REGNET System)					
	Complete new digitising	Migration of existing digitising	Co-existence between different systems	Other models	
	Yes, archival material.	Yes, of database & scanned portraits.	Yes, coexistence with national cataloguing standards for the archival material necessary.		
2. Type of aimed digitising					
	Textual descriptions	Electronic Surrogates	Digital Texts	Digital audio/visual material	Additional productions
	Texts describing items	Images of instruments			Fragments on Measurement theme and Linnæus theme.
3. Configuration framework (Standards, Tools & other definition					
Textual description (bibliographic information)	Data fields	Tools	Other remarks you found necessary to describe the production of textual descriptions		
Electronic surrogates (2D/3D images)	Naming & Filing	Resolutions	Tools	Software	Other
	JPEG, TIFF	350	Digital camera, scanners	Adobe Photoshop	
Digital texts	Naming & Filing	Tools	Software	Other	
	*.pdf		Acrobat Reader		
Digital audio/visual material	Naming & Filing	Tools	Software	Other	
Additional productions	Naming & Filing	Tools	Software	Other	
	html		Dream weaver		

Continuation

E. The digitising process	
1. Work plan & Work packages (necessary steps)	
	First a final selection and preparation must take place. Then the scanning will start, which will be followed by the writing of fragments for the themes. When information from technical providers on how to migrate databases is ready the migration will commence.
	Steps and work packages needed:
2. Time Plan	
	Describe your time planning: Final selection and preparation, 0,5 PM Scanning, 0,5 PM Writing fragments, 1,0 PM
3. Personnel	
	Project Members and roles: Karl Grenadine, no cost, managing Christer Karlsson, cost, selection, digitising, production of fragments in collaboration with SUL

12.3 The Swedish Natural History Museum Stockholm (NRM)

Digitising Plan for NRM	
The Museum's collections include millions of specimens, and their size and quality place it at a high level. The collections provide the basis for the research carried out in the scientific departments, and, through loans and visits by guest researchers, are constantly used by scientists and institutions throughout the world. It is a crucial role of the Museum to keep these collections available for international research, and to preserve them for future generations. Parts of the collections, presented on the Museum's web pages, are also registered in searchable databases. The museum collection is represented in Botany, Geology, Palaeontology, Zoology. The Museum shop There are about 2000 objects in the shop. The assortment is related to animals, nature, human beings and space. The shop sells books, both for children and adults, some dissertations, textiles, fashion and accessories, stones and minerals, fossils, CDs, CD-ROM, videos, posters, calendars, pens, paperwork, T-shirts, ties, hats, umbrellas, key rings, toys (museum collection of animals, dinosaurs etc), puzzles, games, space toys, space patches, sometimes handicraft. There are also postcards from this collection and during the REGNET project there will be some posters produced. The assortment changes depending on actual exhibitions, tax- and shipping costs etc.	
A. Strategic Considerations	
Goals of digitising activities	Promote the Museum shop and provide access on the web to its goods
Use-type of digitised objects	Availability for the General Public Publish on Web site Publish printed catalogues, articles, brochures. Commercial use through REGNET Professional use – for the museum-shop staff

Continuation

B. Target Collection (description of the selected collection)					
1. Quantity and Quality of selected collection					
Number of objects	C/a 100				
	Real objects	Bibliographic objects	Media objects	Archival objects	
	90	8			
	Such as minerals, jewellery, animals	Botanical illustrations			
Themes					
		Linnaeus theme			
2. Status of cataloguing (for the selected collection)					
Short description	The shop has no catalogue. The objects will be catalogued manually according to the AMICO standard into the REGNET System				
Degree of cataloguing					
	None	Paper-based	Data bases, word processing	Catalogue management system	Digitised catalogue cards (no OCR treatment
	100%				

Continuation

3. Readiness for & status of digitising					
Short description	The objects in the museum shop are not digitised.				
Degree of digitising					
	None	Photo, negative	Digital (no management)	Digital (management)	Other
	100%				

C. The administrative framework				
1. Restrictions & Copyright issues				
	No restrictions on copyright			
2. Internal & external facilities				
	None	Internal		External
		Camera(s)	Scanner	Other(s)
		digital cameras	Consumer level Flat bed	Contracts will be set up on temporary bases
3. Comments on other relevant issues				

D. The digitising approach				
1. Digitising Model (Connection to REGNET System)				
	Complete new digitising	Migration of existing digitising	Co-existence between different systems	Other models
	Yes			

Continuation

2. Type of aimed digitising					
	Textual descriptions	Electronic Surrogates (2D-/3D-images)	Digital Texts	Digital audio/visual material	Additional productions (e. g. fragments, translations)
	Texts describing items cataloguing	100 2D			Fragments on Linnaeus theme

3. Configuration framework (Standards, Tools & other definition					
Textual description (bibliographic information)	Data fields (e. g. the usage of a standard like MARC, EAD, CDWA), own adaptations)	Tools (e. g. existing collection management systems, editors, tools for the processing of scanned catalogue cards etc.)	Other remarks you found necessary to describe the production of textual descriptions		
	AMICO				
Electronic surrogates (2D/3D images)	Naming & Filing s	Resolutions (in dpi)	Tools (photo camera, scanner, ...)	Software	Other (e. g. watermarking)
	JPEG, TIFF	300, 1000	Digital camera, scanner	Adobe Photoshop	
Digital texts	Naming & Filing (e. g. file formats *.doc, *.pdf)	Tools	Software (e. g. OCR software, text editor ...)	Other	
	*.pdf			Acrobat Reader	
Digital audio/visual material	Naming & Filing (e. g. file formats *.wav, *.wma)	Tools	Software (e. g. digital audio editors)	Other	
Additional productions	Naming & Filing	Tools	Software	Other	
	Html		Dream weaver		

Continuation

E. The digitising process	
1. Work plan & Work packages (necessary steps)	
	Steps and work packages needed: First a Final selection and Preparation of objects. Then the Scanning in house will take place and Photographing and digitising by an external firm Followed by cataloguing (new items), describing each item and writing fragments in collaboration with KVA. And SUL.
2. Time Plan	
	Describe your time planning: Final selection and preparation 0.5 mm Scanning, photographing 1 mm Cataloguing and describing items 1.2 mm Writing fragments 0.3 mm *Resources equivalent of 1 mm will have to be redistributed between Work Packages for NRM Suggestion: WP 1 T 1.1 1 mm NRM has performed the work in that WP on a non cost basis
3. Personnel	
	Project Members and roles: Susanne Wadeborn, non cost Manager Staff in the shop non cost 1 person to be employed for 1.5 mm Although the museum has staff and equipment to do the photographing and scanning in-house. The workload on that department is such that an external firm for photographing and digitising might be necessary.

12.4 Stockholm University Library (SUL)

Digitising Plan for Stockholm University Library				
Stockholm university library is one of the largest research libraries in Sweden. The library has large collections within Social Sciences, Humanities, law and Natural Sciences. The rare book collection in Natural Sciences is very highly estimated. The library is busy and dynamic with an emphasis on IT and building up a Learning Resource Centre for the university.				
A. Strategic Considerations				
Goals of digitising activities	Provide information about the Rare books collection, improve access for researchers, students and the general public and improve security/preservation of the collection			
Use-type of digitised objects	1. Availability for Research and for the General Public 2. Educational aspects. Prepare course material on the Linnaeus tradition theme 3. Publish on Web site 4 Publish printed catalogues, articles, and brochures. 5. Use for exhibitions 6. Commercial use through REGNET 6. Professional use – work - material for librarians			
B. Target Collection (description of the selected collection)				
1. Quantity and Quality of selected collection				
Number of objects	C/a 100			
Object types				
	Real objects	Bibliographic objects	Media objects	Archival objects
		100		
		Mostly plates from rare books, some books in full text Botany and Zoology		
Themes				
		Linnaeus theme		

Continuation

2. Status of cataloguing (for the selected collection)					
Short description	The Rare books collection contains c/a 10.000 volumes. The vast majority of these books are not catalogued, but listed adhering to a local standard. The items selected from the Rare books collection will be catalogued directly for the REGNET System. Bibliographic records will be catalogued in LIBRIS according to MARC 21 standard and exported to the REGNET System. Loose plates will be catalogued according to the AMICO standard or Dublin Core, whatever preferred in the REGNET System and linked to the main bibliographic record. However, the card catalogue of the Natural Sciences comprising c/a 400.000 cards will be converted in another project, The Digital Natural History, funded by the Swedish National Bank. The method that will be used is scanning and indexing approximately every 50th title, in a similar way to the method used in Gothenburg university library and ONB. The general aim is to improve access, security and preservation. The work will be done by an external firm following an official tender procedure. This work is scheduled to be finished during the first half year of 2002.				
Degree of cataloguing					
	None	Paper-based	Data bases, word processing	Catalogue management system	Digitised catalogue cards (no OCR treatment
		80 % (lists)		LIBRIS 20%	
3. Readiness for & status of digitising					
Short description	The rare books collection is not digitised at all. The collection consists of books that are unique, delicate and often in folio format. Conditions that make digitising expensive as it is not possible just to scan images even if only low resolution is required for a specific purpose. Most of the books and plates have to be photographed by a professional photographer and then digitised. A smaller quantity of the plates can be scanned on a flatbed scanner. Tests have already been carried out by the library (20 items) with good results.				
Degree of digitising					
	None	Photo, negative	Digital (no management)	Digital (management)	other
	100%				

Continuation

C. The administrative framework					
1. Restrictions & Copyright issues					
	There are no problems about the copyright situation for the selected works to be used in the REGNET portal. However the books are owned by the Royal Swedish Academy and housed and cared for by the university library. Internal agreements will be made between these organisations				
2. Internal & external facilities					
	None	Internal			External
		Camera(s)	Scanner	Other(s)	
		Consumer level digital camera	Consumer level Flat bed	CD burner	Contracts will be set up on temporary bases
3. Comments on other relevant issues					
D. The digitising approach					
1. Digitising Model (Connection to REGNET System)					
	Complete new digitising	Migration of existing digitising	Coexistence of different systems	Other models	
	Yes				
2. Type of aimed digitising					
	Textual descriptions	Electronic Surrogates (2D-/3D-images)	Digital Texts	Digital audio/visual material	Additional productions (e. g. fragments, translations)
	Texts describing items cataloguing	Plates in books 2D	Rare books in full text (very few)		Fragments on Linnaeus theme
					Translations of themes & fragments to English

					Continuation
3. Configuration framework (Standards, Tools & other definition					
Textual description (bibliographic information)	Data fields (e. g. the usage of a standard like MARC, EAD, CDWA), own adaptations)	Tools (e. g. existing collection management systems, editors, tools for the processing of scanned catalogue cards etc.)	Other remarks you found necessary to describe the production of textual descriptions		
	MARC AMICO or Dublin Core	Libris			
Electronic surrogates (2D/3D images)	Naming & Filing s	Resolutions (in dpi)	Tools (photo camera, scanner, ...)	Software	Other (e. g. watermarking)
	JPEG, TIFF	350, 1000	Digital camera, scanner	Adobe Photoshop	
Digital texts	Naming & Filing (e. g. file formats *.doc, *.pdf)	Tools	Software (e. g. OCR software, text editor ...)	Other	
	*.pdf			Acrobat Reader	
Digital audio/visual material	Naming & Filing (e. g. file formats *.wav, *.wma)	Tools	Software (e. g. digital audio editors)	Other	
Additional productions	Naming & Filing	Tools	Software	Other	
	Html xml		Dream weaver		
E. The digitising process					
1. Work plan & Work packages (necessary steps)					
	Steps and work packages needed: First a Final selection and Preparation of the bibliographic material will take place. Then the Scanning in house, photographing and digitising by an external firm will take place. This will be followed by cataloguing (new items), describing each item and writing fragments in collaboration with KVA.				

Continuation

2. Time Plan	
	Describe your time planning: Final selection and preparation 0.5 mm Scanning 0,5 mm Cataloguing and describing items 1.5 mm Writing fragments 0.5mm *Resources equivalent of 4 mm will have to be redistributed between Work Packages for SUL to free resources for photographing and digitising by an external firm. Suggestion: WP 1 T 1.2 1mm WP 3 T 3.2 1mm WP 7 T 7.1 2mm SUL will instead perform the work in those Work Packages on a non cost basis
3. Personnel	
	Project Members and roles: Ingrid Cantwell, no cost, managing Clas-Ove Strandberg, cost, selection digitising, cataloguing, production of fragments in collaboration with SUL Christer Wijkström, no cost, selection External firm for photographing and digitising, cost

12.5 Fratelli Alinari (ALI)

Digitising Plan for ALINARI (FLORENCE)				
A. Strategic Considerations				
Goals of digitising activities	Provide information of and access to the collections of ALI in a convenient form to all audiences.			
Use-type of digitised objects	1. Availability for research 2. Availability for the general public. Both through the REGNET System. Other aspects might be to provide basis information for exhibitions, web site, various publications, restoration documentation, collection research project, and collection management system.			
B. Target Collection (description of the selected collection)				
Theme: Art Gallery, Italian Art Reproductions of works of art concerning different periods and techniques.				
1. Quantity and Quality of selected collection				
Number of objects	50/100 (as suggested by J. Herget IMAC at Florence meeting)			
Object types				
	Real objects	Bibliographic objects	Media objects : digital reproductions	Archival objects
		50/100	50/100	
Themes	Art Gallery: Italian Art			

Continuation

2. Status of cataloguing (for the selected collection)					
Short description	More than 75.000 images are catalogued using an SQL data base. A selection of new images to be digitised for the project will still be catalogued using the SQL data base and filtered for the theme list. The cataloguing is based on a thesaurus with almost 8.000 keywords (chosen with the collaboration of the University of Florence).				
Degree of cataloguing					
	None	Paper-based	Data bases, word processing	Catalogue management system	Digitised catalogue cards (no OCR treatment
				100%	
3. Readiness for & status of digitising					
Short description	Considering the total amount of images of the archive: digitised : **more than 75.000 images.** catalogued **: more than 75.000 images.** **-**The images are digitised from originals (films, slides, vintage prints, daguerreotypes, collotype, and stereotypes…). -Total Alinari's archive amount of images: over 3.500.000 -Total images (owned and/or managed) : about 7.500.000				
Degree of digitising					
	None	Photo, negative	Digital (no management)	Digital (management)	
		2% (on the total amount).	0	100%	

Continuation

C. The administrative framework					
1. Restrictions & Copyright issues					
	The copyright of all the images is owned by Alinari and need its Legal Office approval before any usage. The thesaurus copyright is owned by Alinari. The digitising methodology copyright is owned by Alinari.				
2. Internal & external facilities					
	None	Internal			External
		Camera(s)	Scanner	Other	
		> 70 traditional 2 digital	4	2 CD burners 1 DVD burner 1 DVD jukebox	no
3. Comments on other relevant issues					
	XML standard. JPG2000 image file format. Strategic business collaborations. Image watermarking.				

Continuation

D. The digitising approach					
1. Digitising Model (Connection to REGNET System)					
	Complete new digitising	Migration of existing digitising	Co-existence between different systems	Other models	
				Alinari	
2. Type of aimed digitising					
	Textual descriptions	Electronic Surrogates (2D-/3D-images)	Digital Texts	Digital audio/visual material	Additional productions (e. g. fragments, translations)
	Active-Text describing images.			Digital image.	Italian-Art. Translations.

Continuation

3. Configuration framework (Standards, Tools & other definition					
Textual description (bibliographic information)	Data fields (e. g. the usage of a standard like MARC, EAD, CDWA), own adaptations)		Tools (e. g. existing collection management systems, editors, tools for the processing of scanned catalogue cards etc.)		Other remarks you found necessary to describe the production of textual descriptions
	Data fields		Specific designed tool.		
Electronic surrogates (2D/3D images)	Naming & Filing (e. g. file formats *.jpg, *gif)	Resolutions (in dpi)	Tools (photo camera, scanner, ...)	Software	Other (e. g. watermarking)
	*.jpf	305	Scanner, digital camera	Adobe Photoshop 6	Digimark (see A006)
Digital texts	Naming & Filing (e. g. file formats *.doc, *.pdf)	Tools	Software (e. g. OCR software, text editor ...)	Other	
	*.doc		Microsoft Word		
Digital audio/visual material	Naming & Filing (e. g. file formats *.wav, *.wma)	Tools	Software (e. g. digital audio editors)	Other	
Additional productions	Naming & Filing	Tools	Software	Other	
		Image db management t	Microsoft ACCESS		

Continuation

E. The digitising process	
1. Work plan & Work packages (necessary steps)	
	Steps and work packages needed: A- Selection of objects. B- Digitising of the selected set of images: - Digitising the images: by scanner or by digital camera . - Image crop, colour profiling and post process. - Image set checking. - Thumbnail generating. - Watermarking. - Storage and image management. C- Cataloguing the selected set. - Analysis of the image components. - Key subject selection. - Research for links. - Data generating. D- Verify and correct. - Web search and verifying (text and image).

	Continuation

2. Time Plan	
	Describe your time planning: **for 50 objects** A: 0.1 PM B: 0.7 PM C: 3.0 PM D: 2.0 PM
3. Personnel	
F. Further Remarks	
See Alinari's recommendations document (A006).	

12.6 Museon

Digitising Plan for MUS	
The Museon in The Hague dates from 1904. It was established as a museum of industry, with a main purpose to stimulate students to become craftsmen. It developed however quickly into a multi-disciplinary institute with collections in the field of ethnology, physical science and technology, natural history, history and archaeology. Education remained an important service throughout the museum's existence, expressed by its previous name that was "Museum for education". At the moment it offers over eighty different museums lessons to primary and secondary education. The staff consists of 71 regular and about 35 temporary employees. The number of objects in the collection is 300,000, excluding all different species of the natural history collections. The building that is established in 1986 contains 5,000 square meter of exhibition space. The number of visitors is about 250,000 per year. Each year two large and a number of smaller temporary exhibitions are organised, covering all domains that are represented within the museum. Next to the museum lessons the museum offers a broad variety of lectures, courses, demonstrations and workshops.	
A. Strategic Considerations	
Goals of digitising activities	1. Improve the access to the information contained in the museums object and descriptions. Present this information in a thematic structure at the same time. 2. Stimulate visits to the museum through the better access of collection and exhibitions through the REGNET System. 3. Improve sale figures of our museum shop through participation in the REGNET System.
Use-type of digitised objects	1. REGNET System 2. Exhibition units (multimedia) 3. Educational materials 4. Web site 5. Museum PR 6. Internal publication 7. External publication 8. Restoration documentation 9. Collection research project 10. Collection management system.
B. Target Collection (description of the selected collection)	
Masks & Amulets: The objects selected will illustrate the various aspects of the functions and diversity of masks and amulets rather then a complete overview. Measuring: The objects selected will illustrate the various aspects of the functions and (historical) diversity of measuring (time) rather then a complete overview.	

Continuation

1. Quantity and Quality of selected collection				
Number of objects	540			
Object types				
	Real objects	Bibliographic objects	Media objects	Archival objects
	540			
Themes				
	Real objects			
	Masks 200; Amulets 180; Measuring (Time) 160			

Continuation

2. Status of cataloguing (for the selected collection)					
Short description	All objects have short descriptions (Collection management System). They await validation by the scientists.				
Degree of cataloguing					
	None	Paper-based	Data bases, word processing	Catalogue management system	Digitised catalogue cards (no OCR treatment)
	0%	(additional data 40%)		100% (But data from paper base must be added)	
3. Readiness for & status of digitising					
Short description	Most objects need to be photographed (analogue or digital) and data needs to be added and validated				
Degree of digitising					
	None	Photo, negative	Digital (no management)	Digital (management)	Other
		20%	10%	100% Information needs to be added	

Continuation

C. The administrative framework					
1. Restrictions & Copyright issues					
	Copyright rest with the museum for 80%. Restrictions: Models for integration in the REGNET System are needed: The Museon wants to have their right laid down in the T.I.P. and in the C.A. with the restriction that we allow use for the duration of the project. Prolongation beyond this needs to be discussed.				
2. Internal & external facilities					
	None	Internal			External
		Camera(s)	Scanner	Other(s)	
		yes	yes		Due to lack of capacity in personnel we need to contract some external companies. Planning: process has already started. Needs: additional services and money!
3. Comments on other relevant issues					

Continuation

D. The digitising approach					
1. Digitising Model (Connection to REGNET System)					
	Complete new digitising	Migration of existing digitising	Co-existence between different systems	Other models	
	Yes, objects	yes, from collection management system (The Museum System)	yes, with The Museum System (SQL-based)		
2. Type of aimed digitising					
	Textual descriptions	Electronic Surrogates (2D-/3D-images)	Digital Texts	Digital audio/visual material	Additional productions (e. g. fragments, translations)
		2D/3D images of objects			fragments translations

Continuation

3. Configuration framework (Standards, Tools & other definition					
Textual description (bibliographic information)	Data fields (e. g. the usage of a standard like MARC, EAD, CDWA), own adaptations)		Tools (e. g. existing collection management systems, editors, tools for the processing of scanned catalogue cards etc.)		Other remarks you found necessary to describe the production of textual descriptions
			CMS: The Museum System		
Electronic surrogates (2D/3D images)	Naming & Filing (e. g. file formats *.jpg, *.gif)	Resolutions (in dpi)	Tools (photo camera, scanner, ...)	Software	Other (e. g. watermarking)
	*.jpg, *.tiff	Variable, depending on the use case 72 dpi up to 300 dpi	Nikon D1, Minolta scan multi, Linotype-Hell opal ultra	Adobe Photoshop 5.5, ACD See	
Digital texts	Naming & Filing (e. g. file formats *.doc, *.pdf)	Tools	Software (e. g. OCR software, text editor ...)	Other	
	*.doc for windows			Word97	
Digital audio/visual material	Naming & Filing (e. g. file formats *.wav, *.wma)	Tools	Software (e. g. digital audio editors)	Other	
Additional productions	Naming & Filing	Tools	Software	Other	

Continuation

E. The digitising process	
1. Work plan & Work packages (necessary steps)	
	Before starting any digitising process it is necessary to establish the urgency of the digitising request, the quality of the digital image needed, the complexity of the objects regarding their photographical aspects (e.g. highly shining object or paintings are more difficult to photograph than other objects), the fragility of the objects concerned, the internal facilities present in the organisation and the claims on these facilities made by others in reference to their priority. **1. Determine use-type of digitised objects** a. Exhibition b. Web site c. Museum PR d. Internal publication e. External publication f. Restoration documentation g. Collection research project h. Collection management system **2. Determine digitising quality needed** a. Standard 72 dpi b. Up to A-4 130 dpi c. Higher quality **3. Determine urgency of digitising** a. Within one day – one week b. Within one month c. Within one year d. Long-term project **4. Object complexity** a. Standard (not highly glossy or extremely large, or microscopic) b. Complex: highly shining object, paintings etc.

Continuation

5. **Fragility**
    a. Normal
    b. Highly fragile
6. **Internal facilities**
    a. None
    b. Photographer
        i. Analogue camera
        ii. Digital camera simple
        iii. Digital camera A-4 130 dpi
        iv. Digital camera > A-4 130 dpi
        v. Scanner simple
        vi. Scanner advanced
    c. Volunteer
        i. Analogue camera
        ii. Scanner simple
7. **Claims for other projects on organisation facilities**
    a. None
    b. Some
    c. All

It is possible to construct a grid to accommodate all the factors mentioned here. It is better to keep these facets in mind and at the same time follow a general approach.

One can determine a basic set of workflow:

We presume that a museum has at least a basic set of facilities: simple digital camera, simple scanner.

Continuation

	External digitising Factors contributing towards this procedure: • High digitising quality needed • Urgency is not high • Large quantities of digitised images needed E.g. Internal or external publications: posters or photos used in exhibitions or images (large numbers) used in the collection management system. Internal digitising Factors contributing towards this procedure: • Images needed quickly • Images needed of low or medium quality E.g. Images for web sites, restoration documentation, images for the collection management system.

Continuation

2. Time Plan	
	Describe your time planning: Work has started, details are worked out asap.
3. Personnel	
	Project Members and roles: Rob Schouten & Hub Kockelkorn: management Annemarie Boer, Peter Wisse and Ger van der Loo: content development and validation Corine Bliek: registration support Chris Raab: Photography

12.7 ICCS

Digitising Plan for ICCS				
ICCS participates in the REGNET project as a content provider and technical developer of the regional node in Bulgaria. It concerns the contemporary Bulgarian art. ICCS works together with the Union of Bulgarian Artists - professional association of 2700 members - artists and critics from all generations. In the REGNET System will be included objects of all of these 16 sections. As the number of the different section objects is expected to be different - with a dominant role of painting, graphic art and illustration, sculpture and design, these 16 topics could be combined for the REGNET System in a more convenient manner (see REGNET site, DEMO section of Florence meeting).				
A. Strategic Considerations				
Goals of digitising activities	Access to a part of the collections of the Union of Bulgarian Artists and the individual members of the Union.			
Use-type of digitised objects	- Availability for the customers, wanting to buy real art objects - Availability for the common users. Having access to REGNET System - Availability for students and pupils using REGNET for educational purposes - To provide in-time information about soon coming/recent/up to date exhibitions, web sites, publications			
B. Target Collection (description of the selected collection)				
The process of digitising of the artists' objects for the Union of Bulgarian Artists has begun several months ago and till now there are scanned about 80 objects. The artists present their photo images about the objects to the Union of Bulgarian Artists where these photo objects are scanned and digitised. The artists fill a membership agreement, concerning individual records about the art object, useful information for content providing and dissemination purposes, as declaration avoiding copyright problems. As an individual artist or Art Gallery, intending to present themselves in the REGNET System through many objects, there is a decision making process, assessing which art objects should be included in the REGNET Art Gallery.				
1. Quantity and Quality of selected collection				
Number of objects	200			
Object types				
	Real objects	Bibliographic objects	Media objects	Archival objects
	200			
		0	0	0
	Art objects			
Themes				
	Bulgarian Art Gallery			

Continuation

2. Status of cataloguing (for the selected collection)					
Short description	The Union of Bulgarian Artists edits a bi-monthly informational bulletin for its members. In the issue of August-September 2001 a publication for the REGNET System appeared. The members of the Union present their objects (photos and images) to the Union of Bulgarian Artists. Because of the summer holidays the call for inclusion in REGNET databases has not be distributed to all members of the UBA, so in the next bulletin second call will be published to invite all members again to participate in the REGNET ART GALLERY.				
Degree of cataloguing	From the beginning of the REGNET project the Managing Board of the Union of Bulgarian Artists has coped with the project as it has estimated to be an advantage for the Bulgarian Artists to have access to REGNET. Because in general the artists' background is not close to Information Technology solutions and functionalities. Contemporary dissemination and help for them must be performed by means of presenting the potential of the project to every artist. Thus the cataloguing is organized on voluntary basis and willingness of the members of the UBA to provide art objects for REGNET.				
	None	Paper-based	Data bases, word processing	Catalogue management system	Digitised catalogue cards (no OCR treatment
	60%	40%	0	0	0
3. Readiness for & status of digitising					
Short description	Until now 80 art objects are ready for content providing. The expected amount of the samples, which will be included in REGNET for testing, is 200 art objects. Real art objects, included in REGNET, will continuously increase.				
Degree of digitising	The available and ready for utilisation photos/images of the Bulgarian artists are digitised in jpeg format. The text information is filled on hard copy forms and should be introduced also in the databases. The part of the digitising the available text is about 30% of the digitising.				
	None	Photo, negative	Digital (no management)	Digital (management)	Other
	30%	70%			
C. The administrative framework					
1. Restrictions & Copyright issues					
	Copyright – Union of Bulgarian Artists. Copyright can be granted by mutual agreement between the artists and REGNET.				
2. Internal & external facilities					

	None	Internal			External
		Camera(s)	Scanner	Other(s)	
			Consumer level, 2 A4 & 1 A3 scanners	CD burners	

Continuation

D. The digitising approach					
1. Digitising Model (Connection to REGNET System)					
	Complete new digitising	Migration of existing digitising	Co-existence between different systems	Other models	
	Yes				
2. Type of aimed digitising					
	Textual descriptions Art object information	Electronic Surrogates Naming & Filing	Digital Texts doc	Digital audio/visual material	Additional productions (e. g. fragments, translations)
	Texts describing items	Images of artists' objects	Naming & Filing		Fragments on REGNET ART GALLERY theme.
3. Configuration framework (Standards, Tools & other definition					
Textual description (bibliographic information)	Data fields (e. g. the usage of a standard like MARC, EAD, CDWA), own adaptations)	Tools (e. g. existing collection management systems, editors, tools for the processing of scanned catalogue cards etc.)	Other remarks you found necessary to describe the production of textual descriptions		
	CDWA. Dublin Core. Own data field list: name, title of the object, year of creation the object, technique, size, price /min – max /, artistic pseudonym, e-mail of the artist, URL of the artist, Specialty of the artist, Year of birth, Living place				

Continuation

<table>
<tr><td></td><td colspan="5">This data is necessary for the describing the object and preparing for the Internet presentation. As the REGNET standard has not been established in the beginning of the digitising process in the Union of Bulgarian Artists, after it's determining it has to be included some more fields according to it. Dublin Core standard is proposed for the Artists' objects. The list of fields (shown above) satisfies the requirements of Dublin Core. For more completeness and preciseness it is better to include two fields more:
• Description of the object according to Description DC Element
• Relation of the object according to Relation DC Element
Now the last field can be particularly filled with the existing data, using the URL and e-mail of the artist and the type of his work (painting, graphic, sculpture, etc.). The Relation option shall be filled from the artist, too - to be satisfied his requirements.</td></tr>
<tr><td rowspan="2">Electronic surrogates (2D/3D images)</td><td>Naming & Filing (e. g. file formats *.jpg, *.gif)</td><td>Resolutions (in dpi)</td><td>Tools (photo camera, scanner, ...)</td><td>Software</td><td>Other (e. g. watermarking)</td></tr>
<tr><td>*.jpg</td><td>128 x 128 pixels
300 x 300 pixels</td><td></td><td>Adobe Photoshop</td><td></td></tr>
<tr><td rowspan="2">Digital texts</td><td colspan="2">Naming & Filing (e. g. file formats *.doc, *.pdf)</td><td>Tools</td><td>Software (e. g. OCR software, text editor ...)</td><td>Other</td></tr>
<tr><td colspan="2">*.doc</td><td>Text editor (Word)</td><td></td><td></td></tr>
<tr><td rowspan="2">Digital audio/visual material</td><td colspan="2">Naming & Filing (e. g. file formats *.wav, *.wma)</td><td>Tools</td><td>Software (e. g. digital audio editors)</td><td>Other</td></tr>
<tr><td colspan="2"></td><td></td><td></td><td></td></tr>
<tr><td rowspan="2">Additional productions</td><td colspan="2">Naming & Filing</td><td>Tools</td><td>Software</td><td>Other</td></tr>
<tr><td colspan="2"></td><td></td><td></td><td></td></tr>
</table>

Continuation

E. The digitising process	
1. Work plan & Work packages (necessary steps)	
	Steps and work packages needed: 1. Collect the objects. 2. Preparing a Photo of the object. At this step it is necessary to determine the environment of the object. For instance the object (painting, sculpture etc.) must be placed on a fundament, and the light, photo and photographing process requires special skills, typical for the professional photographers. This and previous points are executed with the artists' choice and possibilities. The photo of their object is presented at the Union of Bulgarian Artists where the next two steps are performed. 3. Filling a data list . 4. Scanning the photo in high quality. The scanning process is executed at the Union of Bulgarian Artists. Here is performed also the process of review scanned images (using PhotoShop) and put the images on the shelf. The next steps are performed at the ICCS. 5. Preparing two kinds of objects: 128 x 128 pixels, 300 x 300 pixels. These two kinds of scanned objects are necessary for the Internet presentation of the artist's object. At the step of researching "state-of-the-art " for the artists in Internet it was established the existence of these two kinds of presentations. The "little" picture is in the site of the Gallery and if it is necessary, by clicking it could be seen as a "large" picture in a new window. This is the common practice in the Internet Art Galleries and many examples could be seen at the previous reports regarding "state-of-the-art". The "little" picture is put in the Gallery site not only for the better view of the page but mainly for faster loading the site. 6. Preparing the necessary text of the objects. Around the artist's image at the REGNET site has to be shown text, consisting some mandatory fields (which have to be determined and standardized) like Artist, Title, Medium, Year, More Art. The text has to be marked up for every object - Process text into final form - Archive text in repository 7. Beginning the process of combining the image with text. As the text is on a paper it must be inserted in the REGNET System in English and in Bulgarian. It has to be established correspondence between the image and the both kind of texts using code numbers. 8. Audio files (if they will present in a future) - Determine sample rate and resolution - Select digital audio file format - Analyse storage requirements - Perform analogue to digital conversion

Continuation

	9. Check the sufficient of the filled data according to the determined standard. As in the beginning are not used all data, necessary for the CDWA and Dublin Core, some artists have to add their data to be included in the REGNET System. 10. Translation in English. 11. Filling the necessary fields according to the standards. - Filling the CDWA fields, - Filling the Metadata fields according to Dublin Core, - Filling the Fragments' Table, necessary for REGNET. Here are included Incorporation of basic-level links, Adding enhanced –access links or subject terms 12. Store in Digital Archive - store files in directories as specified by naming scheme - register items in REGNET server - deposit items in digital repository (when in use) - all items stored 13. Create Framework - Develop and insert hypertext links - Coordinate search engine link with the REGNET server - Add graphic enhancement to HTML pages - Review framework for accuracy and completeness 14. Assemble Digital Collection - store access aids in directories as specified by naming scheme, register document style access aids in REGNET server (when in use), deposit document-style access aids in digital repository (when in use), generate indices for related CDWA records - prepare customised scripts associated with searching indices and displaying results, add relevant viewers to supported configuration for www access 15. Test and refine - review assembled collection for accuracy and completeness, test links, make any necessary changes, testing completed 16. Release collection - move HTML pages to production area of the REGNET server, provide links to new collection from appropriate points in the REGNET structure, add collection level CDWA record to Dublin Core, release digital collection to public 17. Update

Continuation

2. Time Plan	
	Describe your time planning: Digitising the text of art objects by Word – 0.5 PM Preparation the rest of the objects - 1.5 PM Writing fragments, 1,0 PM Writing Database – 3.0 PM
3. Personnel	
	Project Members and roles: Todor Stoilov – management of the digitising process Krasimira Stoilova – Digitising art objects, writing fragments and database Krasimir Trichkov – image preparation, filtering, adjustment Dimitar Chakarov - image preparation, filtering, adjustment Zlatka Ivanova – document type preparation, format conversation
F. Further Remarks	
Samples, covering 16 chapters on the contemporary Bulgarian Art will constitute the initial content of the Database of the Bulgarian Node.	

12.8 ONB

Digitising Plan for ONB					
A. Strategic Considerations					
Goals of digitising activities	Access to complete catalogue data of ONB picture archive access to digitised archives, conservation + preservation issues, access to virtual exhibitions, online services				
Use-type of digitised objects	Reproduction services, digital archiving, media database services Exhibition, Website, Museum PR, Internal publication, External publication, Restoration documentation, collection research project, collection management system.				
B. Target Collection (description of the selected collection)					
1. Quantity and Quality of selected collection					
Number of objects	1.1 Mio catalogue data, 100 selected digitised objects				
Object types					
	Real objects	Bibliographic objects	Media objects	Archival objects	
		x	x	x	
Themes	Elisabeth, Empress of Austria	Tour d' Horizon	Creation, Apocalypse	Portraits, Botany	
	archival objects	archival objects	archival objects	archival objects	
2. Status of cataloguing (for the selected collection)					
Short description	[Optional] Selection is already catalogued in analogue form (card catalogue). The card catalogue is digitised, the single card available as 72 dpi GIF, which can be searched via STAR database. ONB has developed a web-based indexing system for converting and integrating card catalogues into image databases (for a detailed description see "Best Practice" provided by ONB in T 1.2). For a detailed description of the card catalogue see the project description of the "Digital Image archive" project at the ONB website http://www.onb.ac.at/sammlungen/bildarchiv/projekte/bdb/index.htm .				
Degree of cataloguing	None	Paper-based	Data bases, word processing	Catalogue management system	Digitised catalogue cards (no OCR treatment)
					100%, bibliographic descriptions available via STAR database

Continuation

3. Readiness for & status of digitising					
Degree of digitising	None	Photo, negative	Digital (no management)	Digital (management)	Other
		50% selected objects	100%: catalogue data 50% selected objects		
C. The administrative framework					
1. Restrictions & Copyright issues					
	The copyright of all objects and all data (except academic texts, where prior consent to usage of the individual right holder is required) is owned by ONB.				
2. Internal & external facilities					
	None	Internal			External
		Camera(s)	Scanner	Other(s)	
		x	x	x	cooperation in planning
3. Comments on other relevant issues					
D. The digitising approach					
1. Digitising Model (Connection to REGNET System)					
	Complete new digitising	Migration of existing digitising	Co-existence between different systems	Other models	
			x		
2. Type of aimed digitising					
	Textual descriptions	Electronic Surrogates (2D-/3D-images)	Digital Texts	Digital audio/visual material	Additional productions (e. g. fragments, translations)
	x	2D images	x		

Continuation

3. Configuration framework (Standards, Tools & other definition					
Textual description (bibliographic information)	Data fields (e. g. the usage of a standard like MARC, EAD, CDWA), own adaptations)		Tools (e. g. existing collection management systems, editors, tools for the processing of scanned catalogue cards etc.)		Other remarks you found necessary to describe the production of textual descriptions
	own adaptations (exchange formats according to REGNET DTDs to be defined)		STAR Museums		
Electronic surrogates (2D/3D images)	Naming & Filing (e. g. file formats *.jpg, *.gif)	Resolutions (in dpi)	Tools (photo camera, scanner, ...)	Software	Other (e. g. watermarking)
	*.jpg, *.gif	72 dpi (high quality has still to be defined by REGNET)	scanner		
Digital texts	Naming & Filing (e. g. file formats *.doc, *.pdf)	Tools	Software (e. g. OCR software, text editor ...)		Other
	*.pdf, HTML-texts		text editor		
Digital audio/visual material	Naming & Filing (e. g. file formats *.wav, *.wma)	Tools	Software (e. g. digital audio editors)		Other
Additional productions	Naming & Filing	Tools	Software		Other
E. The digitising process					
1. Work plan & Work packages (necessary steps)					
	Steps and work packages needed: Milestones foreseen: 4. Define specifications for data exchange of ONB card catalogue with REGNET System 5. Preparing On-demand digitising service via REGNET 6. Preparing 100 high quality images according to REGNET themes				

Continuation

2. Time Plan	
	Describe your time planning: Specifications for data exchange: till 1. of November 2001 On-demand digitising via REGNET: detailed workflow plan till 1.12.2001 100 high quality images: 1.1.2002 (standards have to be defined by REGNET consortium yet)
3. Personnel	
	Project Members and roles: Dr.Hans Petschar: Project Management Mag. Peter Prokop: Technical supervisor Mag. Christian Recht: Preparation of content

F. Further Remarks

ONB will prepare data description in order to define data exchange between ONB retrieval system and REGNET Portal. ONB will also provide specifications for web-based searching and displaying search results of ONB catalogue data via REGNET Portal. The User will be able to search the complete ONB catalogue (1,1 million records) via REGNET and activating an on-demand digitising service. For a first version of the new ONB Image Digitising Service and image database see http://www.bildarchiv.at. A user interface for web based searching and ordering has been developed and put into service since July 2001.

ONB has also prepared Online-presentations of highlights of its collections which will be integrated into REGNET (for first examples featuring Elisabeth, Emperies of Austria and Highlights of ONB Collections see http://www.bildarchiv.at). ONB will prepare ca 100 high quality images according to topic specifications of the REGNET content group for displaying and ordering in analogue or digital form.

ONB will provide also the infrastructure for archiving high resolution images and is prepared to act as a Service Centre.

12.9 MECH

Digitising Plan for Stedelijke Musea Mechelen MECH	
The municipal museum of the Flemish city of Mechlin is a museum for history and art. The collection, which contains a great variety of objects (from the early Gallo-Roman time till now), was built out during the last two centuries. The museum has two main objectives. Firstly the traditional care: to collect, preserve, restore, investigate and display objects which can inform the present generation about the social, institutional, artistic, economical, religious, juridical and military history of the city. Secondly the more recent trends, joining in with libraries and cultural centres: the development of public action, the high scientific study of the objects and the dynamic functioning in the municipal society. Being a municipal museum, it has a very specific task. The objects have to be historically and artistically situated in their municipal context, within the rough town-life. The past is made actual by an active participation to the cultural actuality of the present town. To realise these objectives, the management works very hard on the expansion of the museum and the collection. The development of a museum-axis through the old town centre is the new challenge. Four locations are in place or in scaffolding: 1. The old town gate, Museum Brusselpoort, where the archaeological collection is placed; 2. the former aldermen's house, Museum Schepenhuis, where the 15th and 16th century objects find a place; 3. Museum Hof van Busleyden, the heart of the axis where the public working and the research is concentrated and the modern history of the town is displayed; 4. museum of modern and applied art in the old brewery Lamot. By visiting the four museums, the history of the town in all its aspects, being very typical for the Northern and Southern Netherlands , can be discovered and gone through. Joining in with this development, the museum management started a project to disclose the eight historical churches of Mechlin, each with a very rich and special collection of paintings and sculptures.	
A. Strategic Considerations	
Goals of digitising activities	This digitising plan in the context of the European project REGNET and for later stages pertains mainly to the existing paper based material about the objects of the collection of the museum but is also extended to the creation of supplementary texts and images that did not exist before. The main purposes are driven by aimed use-types (see below).
Use-type of digitised objects	Publication of digitised objects in the REGNET System; purposes of collection management system (recognising, identifying objects: low resolution), study (not for publication but with sufficient detail: low resolution), publishing, (Printed catalogues, articles, brochures, promotion, publications, CD-DVD: high resolution), web site (illustrative, not for printing: low resolution), commercial (museum shop: reproductions, e-Business)
B. Target Collection (description of the selected collection)	
Selection criteria: Different factors influence the choice of the sequence of subsets to be digitised: time schedule of REGNET, current planning and activities of the museum, available resources, existing and newly to created tools, familiarisation with new standards and technologies. Another important aspect is that the museum has started recently with entering its paper based collection data into a digital collection management system.	
1. Quantity and Quality of selected collection	
Number of objects	900 +

Continuation

Object types	Real objects	Bibliographic objects	Media objects	Archival objects	
	900				
Themes					
	saints	leather	Habsburg	measuring	portraits
	700	100	50	50	
2. Status of cataloguing (for the selected collection)					
Short description	The paper based collection data is typed and sometimes hand written on a kind of file or folder (per object) with the following characteristics: 2 papers A4, portrait, booklet form, thick paper (nearly cardboard), recto verso, 1st side of second paper (3rd page) has an extra piece of paper to form a bin for storing photos. The total number of folders is estimated at 7000 and lots of them contain errors or are incomplete. Cataloguing is in progress with digitising. If successful, the output of the OCR can be used to feed the digital collection management system (ADLIB) .				
Degree of cataloguing					
	None	Paper-based	Data bases, word processing	Catalogue management system	Digitised catalogue cards (no OCR treatment
		7000		50	
3. Readiness for & status of digitising					
Short description	Tests were already carried out to scan some samples and to apply OCR-techniques on the outcome. The recognition rate reached 95%. Further tuning of the OCR-package will result in even higher recognition rates. In view of the complex folder lay out, the scanning process can take some time. Detailed timing tests will be carried out to check the feasibility. Currently, the number of available images of the objects does not exceed 5% of the written information of the objects.				
Degree of digitising					
	None	Photo, negative	Digital (no management)	Digital (management)	<other>
		5%			

Continuation

C. The administrative framework					
1. Restrictions & Copyright issues					
	The copyright concerns: - images of objects - texts (fragments, publications) - electronic publications - replicas, posters, etc. The user pays fees for texts and reproductions to the museum for those items that belong to the own collection of the museum. For those items, not belonging to the museum but to third parties, figuring in REGNET under the name of the museum, an agreement has to be worked out with those third parties. Examples of third parties: church administration for the images of saints of those churches.				
2. Internal & external facilities					
	None	Internal			External
		Camera(s)	Scanner	Other(s)	
		Planned	Planned	Extra disks	External company
3. Comments on other relevant issues					
	The museum will, in a first phase, collaborate wit an external company to realise the first sets of digitising. The same external company will be asked to organise training for some personnel of the museum. In a second phase the museum aims to create its own internal digitising platform.				
D. The digitising approach					
1. Digitising Model (Connection to REGNET System)					
	Complete new digitising	Migration of existing digitising	Co-existence between different systems	Other models	
	x				
	No direct on line connection is foreseen with the REGNET servers. The digitised data will be delivered via uploading (FTP) or sent via standard storage media to the REGNET Cultural Service Centres.				

Continuation

2. Type of aimed digitising					
	Textual descriptions	Electronic Surrogates (2D-/3D-images)	Digital Texts	Digital audio/visual material	Additional productions (e. g. fragments, translations)
	X (for bibliographic information)	X - Scanning and OCR procession of paper-based descriptions - 2D images			Editing and translations into English of Fragments and Themes

3. Configuration framework (Standards, Tools & other definition			
Textual description	Data fields (e. g. the usage of a standard like MARC, EAD, CDWA), own adoptions)	Tools (e. g. existing collection management systems, editors, tools for the processing of scanned catalogue cards etc.)	Other remarks you found necessary to describe the production of textual descriptions
	Conventions of ADLIB (description and naming conventions)	ADLIB (for the processing of scanned images of catalogue information see below).	If successful, the output of the OCR can be used to feed the digital collection management system (ADLIB). In the opposite case, manually reproducing the paper-based data will be the only solution. In either case ADLIB will become the unique reference for further collection management.

Electronic surrogates (2D/3D images)	Naming & Filing (e. g. file formats JPEG, GIF)	Resolutions (in dpi)	Tools (photo camera, scanner, ...)	Software	Other (e. g. watermarking)
	TIFF as reference (Level 1), JPEG (Level 2 +3)	Level 1: high quality publication (equivalent to the original photographic result) Level 2 standard consultation with sufficient detail (screen quality) Level 3 quick consultation without sufficient detail (thumbnail on screen)	Digital camera, CD-DVD-writers, extra memory, scanner with high resolution, accessories for the scanning of different types of negatives, photo-editing software-packages, etc.	Not specified: Photo processing software.	To be specified

Continuation

Digital texts	Naming & Filing (e. g. file formats *.doc, *.pdf)	Tools	Software (e. g. OCR software, text editor ...)	Other
	*.rtf, *.doc	Scanner	OCR	
Digital audio/visual material	Naming & Filing (e. g. file formats *.wav, *.wma)	Tools	Software (e. g. digital audio editors)	Other
Additional productions	Naming & Filing	Tools	Software	Other
E. The digitising process				
1. Work plan and Work packages (necessary steps)				
	Steps and work packages needed: - Digital conversion of the current catalogue - Producing new entries - Connection with REGNET - Storage and back up			

Continuation

2. Time Plan	
	Describe your time planning: SAINTS 12 months: substantial set of saints within particular scope (protection, fertility) 24 months: extension to wider scope (to be defined) after REGNET-project: further development GILT LEATHER 12 months: substantial set of gilt leather of Mechelen 24 months: completion of the full gilt leather collection after REGNET-project: introduction of new acquisitions MEASURING following the planning of the theme leader HABSBURG following the planning of the theme leader LEATHER all leather objects with exclusion of Gilt leather TOUR D'HORIZON top ten pieces of art
3. Personnel	
	Project Members and roles: Heidi De Nijn Stedelijke Musea Mechelen Lieve Lettany Stedelijke Musea Mechelen Frank Huygens Stedelijke Musea Mechelen Annie Huyghe Stedelijke Musea Mechelen Vic Haesaerts Tarx nv Rosette Sermeus Tarx nv

12.10 GRAN

Digitising Plan for GRAN					
The collection that Granollers City Council will include at REGNET portal is the work on a group of local emerging artists called INcivics. This group of artist started to work together in 1994. The aim of the Granollers City Council is to promote this artists on Internet and to introduce their artworks in the e-Business.					
A. Strategic Considerations					
Goals of digitising activities	Having the INcivics artworks ready to publish on the REGNET portal, to make their works accessible on line to all audiences.				
Use-type of digitised objects	1. Availability for professionals of art (e.g. curators…) 2. Availability for art collectors. 3. Availability or research. 3. Availability for the general public. All of them through the REGNET System. Other aspects might be to provide basis information for website, various publications, restoration documentation, collection research project, and collection management system.				
B. Target Collection (description of the selected collection)					
Theme: Art Gallery Emerging artworks form the region of Granollers engaged to the municipal project “Incivics”. This is a very heterogeneous collection: Photography, Paintings, Engravings, Sculptures, Installations, Video art, Net art.					
1. Quantity and Quality of selected collections					
Number of objects	100				
Sort	Real objects				
Themes	Art Gallery: Emerging Art from Granollers				
2. Status of cataloguing (for the selected collection)					
Short description	The art works are not catalogued in any way. The artists house the artworks. The pieces of art are very different.				
Degree of cataloguing	None	Paper-based	Data bases, word processing	Catalogue management system	Digitised catalogue cards (no OCR treatment)
	100%				
3. Readiness for & status of digitising					
Short description	The artworks are not digitised in anyway. Only the pieces of Net art are in digital support.				
Degree of digitising	None	Photo, negative	Digital (no management)	Digital (management)	
	0 %				

Continuation

C. The administrative framework					
1. Restrictions & Copyright issues					
	The artists are not subscribed to an any Copy Right Society and they will sign up an official document allowing the Granollers City Council showing the images at REGNET portal during 2 years and 2 years more if they do not express their will to be out of the portal.				
2. Internal & external facilities					
	None	Internal			External
		Camera(s)	**Scanner**	**Other(s)**	
		Consumer level digital camera	Scanners – A4 6 A3 and Film Scan	CD burners, audio and video digitalisation facilities	Only on temporary basis.
3. Comments on other relevant issues					
	If any 3-D Virtual Reality model was required, perhaps for sculptures, we would collaborate with an external company called Dortoka (http://www.dortoka.com), with which we have taken part successfully in different projects in the past.				
D. The digitising approach					
1. Digitising Model (Connection to REGNET System)					
	Complete new digitising	Migration of existing digitising	Co-existence between different systems	Other models	
	The artworks				
2. Type of aimed digitising					
	Textual descriptions	Electronic Surrogates	Digital Texts	Digital audio/visual material	Additional productions (perhaps some 3D models)

Continuation

3. Configuration framework (Standards, Tools & other definition					
Textual description (bibliographic information)	Data fields	Tools	Other remarks you found necessary to describe the production of textual descriptions		
Electronic surrogates (2D/3D images)	**Naming & Filing**	**Resolutions**	**Tools**	**Software**	**Other**
	JPEG, TIFF	300-350	Digital or analogical camera, scanners (Film Scan)	Adobe Photoshop, Image Ready, ACD See	
Digital texts	**Naming & Filing**	**Tools**	**Software**	**Other**	
	TIFF, RTF, PDF	Table Scanner	Recognita 5.0; Adobe Acrobat 5.0		
Digital audio/visual material	**Naming & Filing**	**Tools**	**Software**	Other	
	AVI, MP3		Cakewalk Pyro, Adobe Premiere 6.0		
3D Models	**Naming & Filing**	**Tools**	Software	Other	
	MOV	3D Scanner	AutoCAD, 3D Studio, Quick Time, Live Picture		
Additional productions	**Naming & Filing**	**Tools**	Software	**Other**	
	HTML, SWF, MDB		Dream weaver 4.0, Flash, ACCESS		

Continuation

E. The digitising process	
1. Work plan & Work packages (necessary steps)	
	Steps and work packages needed: B- Selection of objects. C- Taking a photograph of the object, video and audio recording (pictures and drawings for 3D models if required) C- Digitising of the selected set: - Digitising the images: by film scanner, table scanner or by digital camera . - Audio and video digitising - Image crop, colour profiling and post process (also video and audio) - Thumbnail generating. - Storage and image, video and audio management. D- Cataloguing the selected set. - Analysis of objects components. - Key subject selection. - Research for links. - Data generating. E -Verify and correct. - Web search and verifying (text and image).
2. Time Plan	
	Describe your time planning: Final selection and preparation, 0,5 PM Scanning, video and audio digitalisation: 0,8 PM Writing fragments, 1,0 PM
3. Personnel	
	Project Members and roles: Cèsar Carreras (responsible of group Òliba) – objects digitalisation Josep Gurri (Dortoka) – 3D modelling (if required)

13 References

13.1 Acronym and General References List

AAT	Art and Architecture Thesaurus	http://shiva.pub.getty.edu/aat_browser/
Adlib	Software system for the collection management for museums. (Adlib Information Systems)	http://www.uk.adlibsoft.com
Aleph (500)	Integrated library system (ExLibris).	http://www.exlibris.co.il
AMICO	Art Museum Image Consortium	http://www.amico.org/
ANNs	Artificial Neural Networks	
AVI	Audio-Visual Interleaved file	
Barco Reference Calibrator	Colour Management Solution (Typemaker).	http://www.typemaker.co.uk
CDWA	Categories for the Description of Works of Art	http://www.getty.edu/research/institute/standards/cdwa
CH	Cultural Heritage	
CIDOC	The International Committee for Documentation of the International Council of Museums (ICOM-CIDOC) / Le Comité international pour la documentation du Conseil international des musées (ICOM-CIDOC)	http://www.cidoc.icom.org/guide/guideint.htm
COVAX	Contemporary Culture Virtual Archives in XML (EU-project).	http://www.covax.org
DRM	Digital Rights Management	
EAD	Encoded Archival Description	http://lcweb.loc.gov/ead/
Easy Cat/Easy Web	Electronic Catalog Production Suite. Software for creating, managing and publishing multimedia and multi-language electronic catalogues (in the web) (AVIT Solutions).	http://www.easycat.com
FAQ	Frequently Asked Questions	
FTP	File Transfer Protocol	
GPRS	General Packet Radio Service	
ICC	International Color Consortium	http://www.color.org
ImageBridge Pro	Watermarking solution of for enterprise customers (Digimarc)	http://www.digimarc.com
ISAD (G)	General International Standard Archival Description	http://palimpsest.stanford.edu/lex/icoh.html

ISBD (G)	International Standard Bibliographic Description	http://www.ifla.org/VII/s13/pubs/isbdg.htm
JPEG	Joint Photographic Expert Group – format commonly used to display photographs and images on the internet	
Katzoom	Software developed by the Central Informatics Service of the Austrian National Library for the search in the digitized catalogue (ONB)	http://www.onb.ac.at
MARC	Machine Readable Cataloguing Format	http://lcweb.loc.gov/marc/
MDA	UK Museum Documentation Standard (Spectrum)	http://www.mda.org.uk/spectrum.htm
MP3	Type of MPEG compression that offers near-CD quality audio	
MPEG	Audio file format that offers good quality and compression	
Museum Gallery	Database system for museums and corporate collections (Gallery Systems)	http://www.gallerysystems.com
OCR	Optical Character Recognition	
OPAC	Online Public Access Catalogue	
PND	Personal Name Data (Personennamendatei)	http://www.ddb.de
RM	RealAudio file extensions	
SAB	Swedish Classification System	http://www.kb.se/bus/sab.htm
SQL	Structured Query Language	
STAR	Software solution for the management of different kinds of collections (Cuadra Associates).	http://www.cuadra.com
TIFF	Tagged-Image File Format – standard format used to exchange files between applications and computer platforms and for print purposes	
TGN	Getty Thesaurus of Geographic Names	http://shiva.pub.getty.edu/tgn_browser/
TGM	Library of Congress Thesaurus For Graphic Materials	http://lcweb.loc.gov/lexico/tgm1/brsearch.html
VRML/X3D	Virtual Reality Modelling Language – provides technology that integrates three dimensions into a coherent model	
WAP	Wireless Application Protocol	
WAV	File format for storing digital audio (waveform) data	

WMA	Windows Media Audio – audio file compression format developed by Microsoft, offers same quality as MP3	
WP	Word Perfect	
XML	Extensible Mark-up Language	
XTM	XML Topic Maps	
Z39.50	Standard for search and retrieval of bibliographic data	http://lcweb.loc.gov/z3950/agency

13.2 Special references "Image bank production and digitising"

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