European Commission

THE FIFTH FRAMEWORK PROGRAMME

The Fifth Framework Programme focuses on Community activities in the field of research, technological development and demonstration (RTD) for the period 1998 to 2002.

OPENHERITAGE

Enabling the European Culture Economy

PART B

RTD Proposals: Description of Scientific/Technological Objectives and Workplan

ist information society technologies

Proposal no. IST-2000-25136

Release 1.0, 8 May, 2000

B2. CONTENT LIST

B3. Objectives

3.1 General objectives

The primary objective of the proposed project is **to create an IT infrastructure and service to improve access to collections information held by regional museums and galleries** so as to encourage visits and fully exploit their educational, tourism and commercial potential. Our hypothesis is that by using network technologies and *e-commerce* methods the collections of regionally distributed smaller museums can be promoted to be as attractive and accessible as larger, better known, museum collections. By integrating the proposed development with other **economic development initiatives** a significant contribution to cultural, educational and economic objectives will be achieved.

The consortium comprises technology partners and museum partners. The technology partners are amongst the most experienced European suppliers of museum and gallery software for collections management, public access and commercial exploitation of cultural assets. The project will bring together their technologies, some of which have been developed under previous European Framework programmes, to create the proposed infrastructure and service capability.

The museum partners will provide both content and access to a network of smaller museums which will form a test constituency for initial *OpenHeritage* implementations. Museums will be encouraged to participate by the offer of software and facilities for digitising content in exchange for the opportunity for the project to develop and share in the economic value of the digital assets.

Museums will have the choice of having their own **in-house software** and systems or of having IT services provided on a central service to which they are networked. The latter, ASP (Application Service Provision) model, is growing quickly in the commercial sector and has great promise for smaller museums. **Territorial Service Centres** will be created to provide these services. Regions have been selected on the basis of the likely economic benefit which the region would gain from the operation of the system and services. Thus a key part of the project is the use of **economic analysis tools** to help optimise the operation of the service. A further objective is to create a website, a **portal**, allowing global access to the networked resources established through the components of the project described above.

Finally, after initial funding from Framework 5, *OpenHeritage* will become an independent business generating revenues from both the provision of services to the Cultural Heritage (henceforth, CH) sector and by brokering resources to other media industries, for example educational publishing and television programme production.

The proposed project is timely on three main counts:

1. It builds on the existing, proven, technological capability in CH software and systems. It will continue this dynamic and help maintain Europe's current lead.
2. It coincides with the maturing of *e-commerce* as an accepted way of doing business. This will remove many current barriers or inhibitions about the exploitation of digital cultural resources.
3. It coincides with a growing understanding of the role and potential of ICT in the emerging *culture economy*. This will increase the markets for digital "cultural" products.

By pursuing the above objectives, *OpenHeritage* will foster the creation of substantive, durable solutions and infrastructures to improve access to digital CH for citizens (final users), tourists and professionals (cultural "mediators", media industries, publishing businesses, educators, tourist operators, etc.). It will design, verify, implement through adequate enabling technologies and validate a comprehensive model for the valorisation of the European CH by leveraging sustainable innovation and by exploiting the opportunities offered by the so-called *new economy* with its rapid shift towards the accessibility of user-driven cultural services and personalised entertainment experiences.

To support the cultural system in an effective and sustainable way, the project promotes a virtuous cycle based on sound socio-economic (henceforth, S-E) criteria:

1. The definition and management of the **territorial identity and competitive profile** of each CH scenario through advanced territory modelling systems;
2. The promotion and enhancement of memory institutions (in the frame of this project, mostly museums, but also archives and libraries in relation to access to precious and fragile heritage documents) by means of effective, **user-oriented access technology** extending the traditional collections management features;
3. The effective management and promotion of innovative memory institutions by means of state-of-the-art **Territorial Service Centres** providing facilities management, customer relationship management and *e-commerce* services and leveraging the potential of cultural tourism;
4. The effective **promotion and exploitation** of CH-related community-building services and rich media assets by means of a dedicated world-wide CH portal.

The 3rd and 4th of the levels above create, once the ramp-up phase is completed, the **economic** resources needed to feed and sustain levels 1 and 2, which are anyway, in the short to medium term, able to provide significantly broad results in **social** terms. The overall model therefore balances the S-E equation while triggering positive expansion cycles.

3.2 Scenario

As it has been pointed out by several surveys (e.g., the reports on the Socio-Economic Research Dimension of projects in the IST Programme issued by the European Commission), the application of technological solutions to memory institutions (in fields such as the multimedia management and valorisation of museum and library collections) has failed to express substantive and sustainable results. This can be traced back to a number of main reasons:

- The kind of access to CH institutions and repositories granted by Information and Communication Technology (ICT) has generally been spotty and partial, due to the lack of real *conditions for its spread* in socially significant terms;
- The lack of a self-supporting economic model for the promotion and exploitation of CH through ICT;
- The improper use of innovation, that has very often been deployed in an auto-referential way (mainly aimed at satisfying a restricted circle of scholars, industry technocrats and public-sector funders);
- The excessive "technology push" in the use of virtualisation, to the expense of a sound understanding of the global vs. local dialectics (virtual museums tend to cancel local physical institutions and to annihilate the territorial dimension and identity of CH);
- A "pioneering approach" to innovation often oblivious of the very real problems in making technology affordable and sustainable over time for memory institutions;

- An approach mostly oriented to the delivery of technological products that is losing contact with the emerging *accessibility* and *experience* trends in society and markets;
- The feeling memory institutions have of ICT and multimedia as of something that is "pushed" into them from the outside, with frequent rejections and a generalised lack of compliance resulting in improper use and quick obsolescence.

The present scenario – very effectively described by Jeremy Rifkin in his recent essay *The Age of Access* (New York, Penguin Putnam 2000) - sees a fast-paced shift from an "old" economy made of goods and physical transactions towards a new "cultural economy" based on intangible services and on accessible, on-demand "experiences" where a dominant role is played by the media industry, by tourism, entertainment and cultural self-accomplishment. It is a strongly user-centred system of values where **access** (the possibility to have at will) becomes the dominant concept and experiences have to compete with one another for a limited set of economic and time resources.

Memory institutions are therefore in the uncomfortable position of having to compete (in terms of entertainment and experience value) in a new, unusual horizon subject to market forces. This is a particularly severe problem for the multitude of less famous memory institutions that represent up to 95% of the existing CH in most European countries, but do not benefit from the spotlights of prestigious locations and from huge "routine" touristic flows.

Nevertheless, this "diffuse heritage" represents the bulk of the heritage that will fuel the media and "cultural/touristic experience" markets as they become the leading social phenomenon and economic force in developed countries. It is from here that the possibility stems for Europe to excel and to leverage an unique continental strength.

3.3 Detailed objectives

The objectives of the project are summarised in the drawing at the following page:

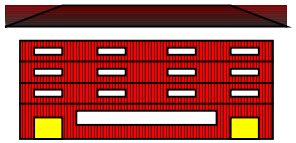
1. The development of dynamic, computable **models of territorial CH systems** aimed at assessing and valorising the prospective S-E strengths of each region or location. These models, based on an S-E rating of the vocation and attraction potential of each territory, make it possible for local policy makers, economic actors and memory institutions to determine/benchmark the positioning of each system in the competitive scenario and to enhance (in strategic terms) and leverage (in operational terms) the local CH areas of excellence.
2. The development through integration of an **innovative solution for collections management** (henceforth, CM) and user access in museums, archives and digital libraries. The new solution builds upon the strengths of two existing CM systems (developed by two of the consortium partners). A local ("in-situ") technology, it aims at a dramatic shift in the way memory institutions resort to technological solutions in terms of *user orientation* (by associating strong user access and attractive multimedia interaction technology to a sound and standards-based CM and indexing core), *access solutions* (by making Intranet/Internet technology ubiquitous, inside the museums and throughout museum networks) and *deployment model* (by making the revenues expected from the valorisation of CH media assets pay for most of the technology).

OPENHERITAGE

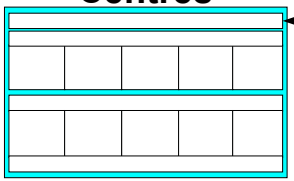
CORE OBJECTIVES AND DEPLOYMENT MODEL

WHAT

New advanced technological solution



Service Centres



In-situ: S-E growth, touristic flows

On-line: community, value-added CH media

Revenues support the creation of local technology and Service Centres

Develop regional models

Bring sustainable multimedia technology into memory institutions

Manage the local systems via dedicated infrastructure

Leverage the culture economy via TSCs and the OH portal

HOW

- Understand the local CH system
- Rate and benchmark it in S-E terms
- Build on its specific strengths
- Prioritise investment and stretegic planning

- Make technology attract visitors
- Federate local not-for-profit forces
- Multiply the production of content
- Trade low prices for media rights

- Make technology manageable
- Empower networks of memory institutions
- Make every visit a customised experience
- Bring CH to customers via CRM services

- Attain multi-national critical mass
- Leverage the synergy with in-situ technology
- Induce tourism and local S-E growth
- Sell value-added media assets

CATALYSTS

AGREEMENT

- *Digital media rights*
- *Royalties to museums finance technological innovation*

€

CEC SUPPORT & VENTURE CAPITAL

- *Creation of TSCs and portal*
- *Promotion*

REVENUES

3. The deployment of core territorial **service infrastructures** (the **Territorial Service Centres**, henceforth TSCs) supporting memory institutions through a host of facilities management, customer relationship management (CRM), storage, promotion and transaction services that range from ensuring the network and system management of the hardware and software equipment installed in museums to the outsourced management of sophisticated Call Center, booking and *e-commerce* functions. The TSCs bring into CH the emerging *new economy* model of the Application Service Provider (ASP) and represent the territory-savvy enabler that can ensure a viable and effective deployment of ICT in memory institutions, while at the same time enabling a substantive exploitation of both individual memory institutions and territorial systems (as described in the relative territorial models) as a synergetic whole.
4. The **validation** of the model and related technologies and services in **significant test beds**, through a range of technological and territorial validation activities described in more detail in section B6.
5. The development and joint management (by four of the project partners) of **a global "openheritage.com" enterprise** aimed at the exploitation of the European CH on the world market. The company will develop an **advanced portal** on Art and Culture encompassing both traditional "community" features and *business-to-business* areas for the exploitation of rich media assets, mostly derived from the establishment of local systems inside territorial memory institutions. The multi-national **business initiative** will implement the *OpenHeritage* business model on a significant scale and will ensure (with the support of CEC financing and the possible intervention of venture capital) the dissemination of the initiative and its effective exploitation over time.

Objectives 2 and 3 above represent the two main steps of a **content development pipeline** (an enabler of the success of step 5, the Portal) where high-quality contents are authored by feeding the local systems with multimedia presentations and by enabling the services at the TSCs with comprehensive territorial and touristic information.

One of the key 'catalysts' of the *OpenHeritage* (henceforth, also called OH) strategy is also represented by the possibility to establish a **special agreement** with memory institutions, granting them a very affordable access to the new CM solution, to the digitisation of contents and to the services of the TSCs in exchange for the non-exclusive rights to valorise and to exploit their institutional identity and digital CH media rights for at least 9 years.

Models of this kind, though not commonplace, have partly been explored already (e.g., the AMICO model in the U.S.A. provides part of the framework); they will be perfected according to local (national, regional) requirements and fully deployed in order to allow OH to rapidly reach critical mass.

Early feasibility assessments have already been carried out in Italy and in the UK (in relation to the 24-Hour Museum project, where one of the partners is involved). In Italy in particular, formerly one of the most tightly regulated countries in this field, the project aims at leveraging a momentous reorganisation that is taking place with the transfer of competence on state-owned museums towards local authorities (Dlgs. 112/1998). The transfer is subject to the determination, by a dedicated Commission, of minimum quality standards the local administrations will have to ensure. The new "in-situ" OH solution will strive to qualify (in a virtual lack of competition) as the premier compliant technological solution for territorial museums, and will thus represent for local authorities the one-stop-shop solution for the advanced valorisation of their newly acquired heritage. In this scenario, **there is a broad and verified keenness to stipulate time-limited deals** involving the concession of rights in exchange for royalties and for the affordable access to ICT technology and services.

3.4 Expected results

The main measurable results expected from the project are the following:

- Memory institutions will leverage sustainable technology to **become actors of the new economy**. They will become able to deliver a valuable experience and to compete in the new experiential market; as a result, they will increase the number of visitors and the satisfaction of their customers.
- The CH media assets in memory institutions will make the cultural system able to **support itself** and to finance subsistence and innovation.
- The trend towards the **alienation of CH rights** in favour of extra-European economic actors will be reversed and effectively minimised in a 5-year period.
- Territorial Service Centres will make technology manageable and will leverage the **resources of cultural tourism**.
- The gradient of in-situ systems, Service Centres and global portal will create **an harmonious S-E dimension** that makes it possible to blend the local and the global.
- Since technological innovation is not pursued *per se*, but in the frame of a viable strategy that ensures critical mass, the project will be able to provide **significant employment results** (mainly through the involvement of territorial not-for-profit forces developing contents according to OH specifications) and a much **broader access** to CH resources all over Europe.

The overall focus of the project is on *open*ing *heritage* to the future through innovation, thus helping memory institutions fulfil their mission: to give the most comprehensive access to their collections not only to restricted echelons of specialists and technologists, but to the largest public of Europe, where memory and cultural identity belongs.

B4. Contribution to programme/key action objectives

4.1 Direct contribution

The project directly relates to the objectives of Action Line III.1.4 (*Access to digital collections of cultural and scientific content*), to which it contributes significantly.

The project is based (underlined are the references to the IST Workprogramme) on innovative system integration (in both the new CM solution and in the TSCs) and provides reference implementations of a new advanced CM solution, of model Territorial Service Centres and of a business-to-business CH portal. The TSCs in particular provide a relevant test bed federating content with navigation, search and retrieval and tools enabling the easy, multi-channel access to diverse and distributed CH information and contents.

The TSCs also provide - besides other, more conventional metaphors and services - advanced community building tools such as navigable interactive representations of virtual art cities, enabling the tailored and interactive use of distributed resources and collections.

The overall objective is therefore a sustainable European cultural landscape that leverages most effectively Europe's unrepeatable opportunity as the *new economy* - with its special emphasis on cultural, recreational and experiential values - is in the process of shaping itself and the new S-E scenarios.

To fully support this main goal, the project will address data collection, data exchange, information retrieval, trust and security, benchmarking and standardisation issues with the utmost attention to the existing and emerging best practices, with an eye to establishing and confirming consistent reference practices and guidelines.

4.2 Secondary contributions

The content management and system monitoring modules in the new museum technology envisaged by the project match the objectives of action line III.1.2 (*Personalising content: personal, user-friendly tools for access, creation, repurposing, management and publishing of multimedia content, by users for users*) by providing a centralised and user-friendly means to access and to personalise heterogeneous assets in large distributed museum collections.

The proposal deeply affects AL I.5.4 (*Intelligent systems for improved tourism and travel services*). The line is addressed by offering personalised and interactive services for cultural tourism, in direct relationship to dynamic territorial models, through the services (including CRM, booking and payment facilities) delivered by the Territorial Service Centres. For instance, the TSCs will allow tourists to plan their travels in a region and to define itineraries through memory institutions, and will support them throughout their stay by means of real-time guidance services with optimised solutions for accommodation, leisure and in-depth cultural experiences.

The project is also relevant to AL II.1.1 (*New perspectives for work and business*). The Action Line is addressed by leveraging the S-E potential of the new cultural economy through the direct involvement of a critical mass of memory institutions, with a relevant impact expected on policy makers, CH-related businesses, CH professionals, institutions and final users. The final perspective is the integration of CH into effective economic cycles, with relevant organisational and occupational effects throughout Europe and in less-developed Countries in particular.

B5. Innovation

5.1 General issues

In the frame of the objectives described above several innovation efforts will be actively pursued, mainly in the form of an innovative integration and finalisation of existing enabling technology:

- Collections management systems including advanced content management solutions;
- Internet technology and advanced Application Service Provider architectures (network facilities offering *on-demand* applications services) with state-of-the-art CRM and *e-commerce* solutions;
- Network & system management solutions;
- Portal architectures, encompassing on-line payment and trust technology, user profiling and dynamic modelling/customisation technology;
- VR representation and navigation systems (e.g., building on the existing engines provided by Blaxxun Interactive or by Active Worlds);
- Multi-channel delivery systems integrating telephone, Web, WAP, DAB digital radio, WebTV, thematic television, etc.;
- Strategic simulation and management supervision systems derived from management information system architectures.

Nevertheless, it is important to state that the focus of this project is not on the development of new cutting-edge technology, but on leveraging (in a creative way, partly by deriving models and concepts from different IT domains and economic scenarios) available advanced solutions in order to trigger and to sustain over time the paramount S-E potential of European CH, which is now consistently choked by bureaucracy, by a lack of vision and momentum and by an often blind and ineffective deployment of innovation.

5.2 A 4-step innovation strategy

The four main areas of innovation pursued by the project are the following:

1	**REQUIREMENT**	The future of the culture economy resides in its capability to support the *glocalisation* phenomena, that make the local dimension much more than a mere subset of an undifferentiated global CH. The bureaucratic descriptions of CH assets and collections have to be superseded by methodologies encompassing an S-E weighting and contextualisation of the CH. It is therefore necessary to read the territory in S-E terms, to rate it, to benchmark it against potential competitors and to create dynamic models, prioritising strategies in investment and promotion
TERRITORIAL MODELS	**INNOVATION**	**Borrowing territory analysis methodologies and tools to enforce a true territorial dimension in the understanding and valorisation of CH assets**
	METHODOLOGY	Use of advanced modelling techniques, benchmarking of the CH model of each territory against a Strategic Atlas of Europe, development of dynamic data feeding techniques, implementation of advanced simulation algorithms. The project will encompass the development of 3 territorial models for the 3 territorial test beds

The innovative CH modelling solutions will be deployed by partners C01 and P09 and will leverage their involvement in major national initiatives aimed at developing solutions for territory development and for an integrated approach to S-E disciplines (e.g., these solutions have already been applied, with surprising results, to the valorisation of the Melfi area in southern Italy).

2 COLLECTIONS MANAGEMENT PLATFORM		
	REQUIREMENT	Memory institutions have to meet the entertainment and experiental challenge posed by the new cultural marketplace. To be able to better support themselves and to find the resources for the innovation they need, an effective and consistent way to express rich media has to be found
	INNOVATION	**Creation through integration of an innovative Collections Management platform with a strong emphasis on the client side, a modular architecture and flexible content management and administration features, with the potential to effectively leverage CH assets in memory institutions**
	METHODOLOGY	Integration of the two existing platforms developed by partners C01 and P02, by leveraging their different emphasis of core server functionality and on multimedia client access. In the process, the first true network computing platform in the field of collections management is developed

The innovation in collections management will involve merging the technologies of partners C01 and P02 to develop a new solution. The provisional name of the new product is *OpenMuseum*. The new system will build on the strengths of both P02's system (very capable in the server, database management, information retrieval and standards areas) and on C01's systems for museums and digital documents (innovative and effective in the content management and multimedia/client access areas). The two companies will exploit the new product together, in separate territorial areas, and will plan a joint product maintenance and development strategy.

This component of the project, while apparently secondary, plays in fact a strategic role, in order to make the subsequent on-line strategy credible. Most of the on-line ventures now facing the market, in fact, tend to be "empty" or simply informative portals about museums. *OpenHeritage,* on the contrary, will be the result of extensive activities carried out inside memory institutions, and will offer value-added "rich" multimedia content besides images. To this end, *OpenMuseum* will be "pushed" into museums by means of an aggressive commercial strategy and with the temporary support of venture capital, until critical mass is reached.

The OH team has carried out a comprehensive survey of the existing international collection management solutions (see the tables at the end of this section, where the existing products are rated from a top level of 1 to a low 5, according to their capability to express the range of solutions desired for *OpenMuseum*). Practically all the existing solutions are more or less capable database management systems for the internal management of museum collections, and mainly target museum curators and administrative departments inside institutions. Although many feature public access stations (mostly for image browsing and search) and may feature Web publishing modules for remote access, they lack several or all of the following enabling capabilities:

- Making museums entertaining and "worth the experience" by means of a management of collections effectively oriented to local and remote users;
- A museum-wide distribution of information resources through a "system" of multimedia solutions connected by a high speed network, with the support of a central management station;

- Modularity, with a host of different client modules (fixed and portable ones) that can be composed for any requirement;
- A distinctive and unified "look and feel" throughout modules and installations;
- A seamless integration of museum collections with tools for the access to and the valorisation of Digital Libraries;
- An advanced network computing architecture that natively supports the creation of thematic museum networks and the seamless access to meta-collections;
- Server modules encompassing an object-oriented DBMS engine and interfaces for network and system management (integrated with the Territorial Service Centres), content management and interactive client access configuration.

OpenMuseum will be an affordable, reliable "turnkey" solution making it possible (through an appropriate customisation and configuration of application templates) to define, structure and implement in hardware, software and contents the whole range of facilities and applications required for the development of an advanced museum system, based on the digital management and distribution of media and on multimedia technologies offering a high level of interactivity.

OpenMuseum will leverage a state-of-the-art collections management core promoting it into a shared digital repository (text, image and multi-media database) supporting all the information management and presentation needs of the museum. The same repository will support secure curatorial and collection management services and scholarly access, as well as multi-modular interactive public access systems delivering selected contextual and thematic materials. The result will be an integrated back-of-house/front-of-house system configured from a synergy of specific vertical modules.

It is important to see *OpenMuseum* as an innovative prototype that could lay the groundwork for a number of specific adaptations for various digital cultural heritage environments, from museums to digital libraries to archives and educational platforms (from schools and universities to distance learning). **In OH's strategy it will foster the integration of digital repositories of CH media into a certified high-quality commercial brokerage servic**e, thus providing a major bridge towards the European multimedia content industry.

3		
TERRITORIAL SERVICE CENTRES	**REQUIREMENT**	Memory institutions need the support of professional services in the areas of maintenance, system and network management, customer relationship management, promotion and global exploitation. Moreover, a true and effective valorisation model requires a dynamic link to a strategic model of the territorial CH system
	INNOVATION	**The design and implementation of Territorial Service Centres offers a crucial guarantee that technology is rapidly and effectively deployed in memory institutions. The novel concept of an Application Service Provider for the territorial CH, while not requiring the development of new technology, introduces the missing link between the local and the global dimensions and provides memory institutions with the support and valorisation support they need**
	METHODOLOGY	Bringing the architecture and service capabilities of last-generation, Internet-based ASPs in the field of CH ensuring a full coverage of territorial requirements in dynamic connection with strategic territorial models. Customer relationship management and tourist guidance functions are fully managed, conveying the CH one-stop-shop of each territory and encouraging physical visits inside the area

The technological and service architecture of the TSCs, based on a comprehensive analysis of the core service requirements of an advanced ASP (datacenter capabilities for distributed computing using *Java* components; customer relationship capabilities using diverse technologies from computer telephony integration to data warehouses; security architectures; remote monitoring and assistance systems; distance learning functionality, etc.) is described in more detail in section B6, and is the result of the direct experience of partners C01 and P09 in the implementation and daily management of Internet-based service infrastructures for the needs of territorial public administrations and final users.

A subtle but strategic role TSCs will play relates to the clarification and re-balancing of the economic relationship between CH and tourism. As it has brilliantly been pointed out (Carlo Fuortes, *Museums and the "rentier" syndrome*, www.ilsole24ore.it/cultura, 2000), no memory institution can today express (out of ticket fares, shop services or other direct or indirect means) more than 50% of its actual costs. As a matter of fact, though, the CH system is one of the main economic attractors in numberless European territories and accounts for a large part of the riches that fall back on local accommodation operators, restaurants, tourist guides, shops and public administrations. In other terms, the CH system is "poor" because its revenues are benefited outside the system, by different subjects. The TSCs will make it possible to canalise the stream of cultural requests and to measure/manage the actual value that is catalysed by the CH system. This will help CH emerge as a S-E force in its own right and will give policy makers and institutions effective evidence for the destination of adequate resources, out of any subsidy scepticism, to the cultural field.

4		
OH GLOBAL EXPLOITATION PORTAL	**REQUIREMENT**	Existing portals on CH are all more or less detached from actual memory institutions and are either informative or - when transactional - mostly dealing with raw media, such as image collections. Business-to-business (B2B) sections are primitive and mostly rely on on-purpose acquisitions Top-down approaches fail to feed portals with value-added media and cannot leverage the true potential of European CH. Moreover, their eventual success does not affect memory institutions (with whom they compete) and there can hardly be any critical mass effect or positive S-E feedback
	INNOVATION	**To design and to implement an innovative model of CH portal that represents the logical outcome of a consistent multimedia value chain, rooted in memory institutions. These leverage the co-ordinated involvement of territorial not-for-profit certified partners in order to parallelise and to standardise the production of rich media that is ready for the exploitation through the portal (towards media channels, Internet services, publishing, education). The OH portal thus makes it possible for Europe to attain critical mass in CH and to effectively leverage one of its distinctive strengths**
	METHODOLOGY	The culture economy requires a bottom-up approach where technology penetrates memory institutions in a capillary way and produces a critical mass of rich media. Portals can thus provide both a 'community' level, where basic (free or almost free) services trigger a large number of hits, and a value-added section devoted to the B2B exploitation of rich media (ready to use multimedia objects stemming from the creation of contents for the local systems)

The present scenario shows a variety of portals specialised in CH, that can be characterised by their sponsor (public, private or not for profit and non-government), the kind of information that they give access to (practical information to access an heritage location or to attend events, or resources for education, for research or for entertainment) and finally the area of the CH they are dealing with (Archaeology, Fine arts, Folklore, etc.).

From a survey over Internet using various keyword entries or accessing well-known websites, it appears that CH Portals today are:

- mainly set up and maintained by public entities (Central administration in ministries of Culture such as
  - http://www.iccd.beniculturali.it/ in Italy
  - http://www.culture.fr in France
  - National institutions as famous as the Smithsonian Institution in the US with its website http://www.si.edu
  - National or international bodies or associations such as the UNESCO at http://www.unesco.org/culture/index.htm
  - or AMICO at http://www.amico.org
- mostly dealing with practical information as a start, and, then, at a further stage, giving access to detailed image and text information about sites or artefacts;
- providing popular access to fine arts, archaeological sites and world CH sites protected by UNESCO.

Private portals starts to emerge from this panorama centred on public information, mainly in North America with the Archaeology Portal that gives access to websites dealing with archaeology around the world, and MuseumNetwork.com giving access to museum websites around the world (http://www.museumnetwork.com).

At any rate, most of these sites limit their services to giving up-to-date and unified information on the locations and collections of other CH sites and in some cases offer a window on cultural events, discussions and more or less organised thematic communities.

In Italy, there are attempts mostly limited to this information directory concept (http://museionline.it; http://museumland.com).

Since several years, Museums on Line in France and Corbis in the USA provide comprehensive services in the field of on-line image research and licensing. Their services are limited to the business-to-business market in the sector of art iconography.

A not-for-profit initiative supported by the UK government is worth mentioning as it links museum websites in UK and abroad. Called The 24-Hour Museum http://www.24hourmuseum.org.uk/home.htm, it provides a framework for museums to give access to richer information and resources.

The initiative closest to the OpenHeritage concept is the Scottish SCRAN project (at http://www.scran.ac.uk), as it already gives access to the CH resources of Scotland by networking the institutions all over the region.

Some other useful portals of minor extent are the following:

- http://culture.coe.fr/pat/eng/patlist.html of the Council of Europe
- http://www.austriaculture.net of the Austria Cultural Institute in New York
- http://www.limousin-culture.asso.fr of Limouson province in France
- http://wwar.com of World Wide Art Resouce, an access art portal of the Getty Images Group

Various projects to give access to national CH through national portals exist, but they are always confronted with budget problems.

From the above analysis we can perceive a clear sense of opportunity for the development of an innovative European portal that will give access to comprehensive CH resources, with a special emphasis on three areas that are left almost completely uncovered by the existing systems:

- Dynamic territorial information for the comprehensive representation of territorial CH resources and the real-time guidance of cultural tourists before and throughout their visits;
- The effective, consistent representation of the collections of museums and thematic museum networks, accomplished through a direct connection with the internal CM systems rather than by mere hyperlinks to disparate existing Web sites;
- On-line services for the trading of images and rich media (pre-processed interactive multimedia components that are ready for delivery through many different channels, from publishing to thematic television, to WebTV and education).

5.3 EU and National background

The project is built not only on chosen previous EU funded projects in the domain, in particular VASARI (ESPRIT), NARCISSE (Telematics), RAMA (RACE), BAMBI (Telematics), VAN EYCK (RACE), AQUARELLE (INFO2000), MENHIR (ESPRIT), IMPRIMATUR (ESPRIT), and INDECS (INFO2000), but also on national initiatives held in France (Government digitising programme), Italy (the "Innovation Citadel" research program of the Ministry of Treasury, and the *Parnaso* research programme of the Ministry of Research on Cultural Heritage technologies), UK (24-Hour Museum), Japan (Gifu Prefecture and DAJA initiatives), and Russia (ADIT network).

The project will particularly re-use innovative tools developed in VASARI and MENHIR (imaging technologies: processing and storage tools), in NARCISSE and VAN EYCK (thesauri and authority list), and in RAMA and AQUARELLE (networking heterogeneous materials in databases and publications, use of Z39.50 in co-ordination with the CIMI Group), the innovative business model developed in IMPRIMATUR, implemented and tested in MENHIR and the open standard licensing metadata model being developed in INDECS with reference to the work in the Digital Object Identifier (DOI), RDF/XML and Dublin Core initiatives.

Links will also be established with the ongoing ARTISTE (retrieval and navigation by content) and COVAX (Internet access to library and museum collections using SGML/XML) projects of the IST Programme (5th FP) and – should it be successful – with the REGNET proposal being submitted for the 3rd IST Call, in view of obtaining relevant synergy and conforming to the state of the art in CH metadata, in search & retrieval and information exchange methodologies and in tools for the standardisation, interconnectivity and interoperability of distributed collections.

The concept and application framework of tourist services using ubiquitous Web services and real-time guidance over territorial areas will be developed in close relationship with the IST-2000-25131 project UWA (*Ubiquitous Web Applications*) being submitted for the 3rd IST Call in parallel with *OpenHeritage*.

The digital document technology being integrated into OH derives from the prototype developed in the frame of the BAMBI project and subsequently further developed in the frame of national and regional projects.

The following tables show the results of an internal survey on the existing competing solutions for museum automation and collections management. The survey has been based on authoritative international sources (from the Canadian Heritage Information Network to the British MDA) and on the extensive consultation of on-line sources and enterprise presentations and brochures. Most products have also been directly tested.

One interesting result among the other findings is the emerging hegemony of the U.S.A.(and Canada and Australia) in the CM field, with several of the most advanced products being expressed by non-European companies.

No.	Product	Manufacturer	Web site	Rating
1.	*Accession*	Oaktree Software Inc	http://www.oaksoft.com/access/oaktre.htm	**4**
2.	*ADMUSE*	Adlib Information Systems Ltd.	http://www.uk.adlibsoft.com	**3**
3.	*AIIMS*	MIS Software Development, Inc.	http://www.supernet.net/~msdsales/aiims.htm	**5**
4.	*Archemuse IV 1,6*	GCI Innes Collections Management	http://www.gci.ca/	**5**
5.	*Advanced Argus for Windows*	Questor Systems, Inc.	http://www.questorsys.com/	**1**
6.	*Argus Open Edition v1.0*	Questor Systems, Inc.	http://www.questorsys.com/	**1**
7.	*ARTchive*	HUSK	http://www.husk.com/	**4**
8.	*Artefact* (form. *CMB Storager*)	ArteFact Group (CMB Informationslogistik GmbH)	http://www.artefact.at/english.htm	**2**
9.	*ArtWatch*	Sound Data, Inc.	http://sounddata.com/artwatch/	**4**
10.	*CALM2000*	DS Limited	http://www.dsltd.co.uk	**4**
11.	*Catalist for DOS*	MODES Users Association / MODES Services	------	**5**
12.	*Catalist for Windows*	MODES Users Association / MODES Services	------	**4**
13.	*Collection*	Vernon Systems	http://www.vernonsystems.com/	**1**
14.	*Collections*	Artsystems, Ltd.	http://www.artsystems.com/	**3**
15.	*Collections-Museum™*	Collections Inc.	http://www.intercollect.com/2.htm	**3**
16.	*Datapoint*	DataPoint IT Ltd.	http://www.data-point.co.uk	**3**
17.	*Digital Catalogue Online*	Image Resources Ltd.	http://www.imageres.com/	**5**
18.	*Digital Library*	IBM Corp.	http://www.software.ibm.com/is/dig-lib/	**1**
19.	*Digital Link*	BGM Imaging	http://www.bgmimaging.com/	**5**
20.	*Eloquent Heritage*	Eloquent Systems	http://www.eloquent-systems.com/	**3**
21.	*EmbARK*	Digital Arts and Sciences Gallery Systems, Inc.	http://www.dascorp.com/products/embark/ http://www.gallerysystems.com/	**1**
22.	*Epoch*	Camilla Nichol	------	**4**
23.	*Gallery*	Artsystems, Ltd.	http://www.artsystems.com/	**2**
24.	*GalleryPro*	Artsystems, Ltd.	http://www.artsystems.com/	**2**
25.	*GCOLL*	Videomuseum	http://www.videomuseum.fr/	**5**
26.	*GENCAT*	Eloquent Systems Inc.	http://www.eloquent-systems.com/index.htm	**3**
27.	*Heritage Resource Database*	Summa Informatics Inc.	------	**5**
28.	*Heritage Sentinel*	Sentinel Computer Consultants, Inc.	http://www.sentinelcci.com/webdoc1.htm	**4**
29.	*History Database*	History Database	http://www.history.la.ca.us/	**5**
30.	*House of Images*	House of Images	http://www.hoimages.co.uk	**5**
31.	*HyperMuséo*	SOREIB - Renard Systems	------	**5**

32.	*IDEALIST*	Blackwell Science Ltd.	www.blackwell-science.com/products/idealist/aboutide.htm	**5**
33.	*ImageAXS Pro*	Digital Arts and Sciences Gallery Systems, Inc.	http://www.dascorp.com/ http://www.gallerysystems.com/	**2**
34.	*IMC i-Modules*	Bureau IMC	http://www.museumserver.nl/buroimc	**4**
35.	*INCA*	Hunterian Museum	http://www.gla.ac.uk/Museum/John/incad.html	**5**
36.	*Inmagic*	Inmagic, Inc.	http://www.inmagic.com/	**4**
37.	*KE Emu*	KE Software	http://www.kesoftware.com/kesoft/products/emu/index.html	**1**
38.	*Kleio*	Kleio	http://www.gwdg.de/kleio/	**5**
39.	*Logos Flow*	Collection Management Database: Humanities	http://home.mweb.co.za/lf/lflow	**5**
40.	*MCMS and MCMS-Lite*	Westar Systems	http://www.westar-systems.com/mu.htm	**3**
41.	*MicroMARC:AMC*	Michigan State University	http://www.msu.edu/user/msumarc	**5**
42.	*MicroMusée*	Mobydoc	http://www.mobydoc.fr/info/F_prod1.html	**2**
43.	*Minaret*	Cactus Software Inc.	http://minaretsoftware.com	**5**
44.	*MINISIS*	International Development Research Centre	http://minisis.idrc.ca/minisis	**3**
45.	*MIS*	Ian Morrison	http://www2.scran.ac.uk/staff/ianm/smdo_web.htm#I_MIS	**5**
46.	*Mobydoc Express*	Mobydoc	http://www.mobydoc.fr/info/F_prod2.html	**3**
47.	*MODES for Windows*	MODES Users Association / MODES Services	------	**3**
48.	*MODES Plus*	MODES Users Association / MODES Services	------	**5**
49.	*Multimedia Museum*	Hypersolutions	http://www.hypersolutions.fr/	**2**
50.	*MultiMIMSY 2000*	Willoughby Associates	http://www.willo.com/	**1**
51.	*MuseumWare*	SPACE S.r.l.	http://www.spacesrl.it/	**1**
52.	*MUSIMS*	System Simulation Ltd.	http://www.ssl.co.uk/content/mus.htm	**1**
53.	*PastPerfect*	Altamira Press	http://www.museumsoftware.com/	**3**
54.	*Re:discovery*	Re:Discovery Software Inc.	http://www.rediscov.com/	**3**
55.	*REGIS*	Museum Research Associates	------	**5**
56.	*SNAP! / SNAP! for Windows*	Willoughby Associates	http://www.willo.com/	**4**
57.	*Snbase*	Mobydoc	http://www.mobydoc.fr/info/F_prod3.html	**2**
58.	*Star 3.7*	Cuadra Systems	http://www.cuadra.com	**2**
59.	*Status/M*	Dataware Technologies	http://www.dataware.com/	**4**
60.	*The Gallery System*	Gallery Systems, Inc.	http://www.dascorp.com/ http://www.gallerysystems.com/	**2**
61.	*The Museum System*	Gallery Systems, Inc.	http://www.dascorp.com/ http://www.gallerysystems.com/	**1**
62.	*Virtual Collections*	GCI Innes Collections Management	http://www.gci.ca/	**3**

The base solutions for the development of *OpenMuseum* are two of the ones listed above. They have already made it possible for their creators to experience, with several successful installations and throughout their evolution, the opportunity to deploy a new integrated solution paying special attention to the issues of interactive user access, of dynamic content development and management and of integrated manageability.

B6. Project workplan

6.1 Structure of the workplan

There are two complementary aspects of the project: the **research and development activities**, which are based on tight user relations, and **the validation/test bed activities** that will test and approve the technological solutions, the territorial models and infrastructures and the global exploitation portal.

As it can be seen from the Gantt and PERT representations of the project (see below), the development and integration activities are mainly concentrated in the second half of the first project year (over a global elapse of two years, soon after completion of the requirements analysis) and are completed over the first half of the second year. The test beds (for CM technology and Territorial Service Centres) are started early during the second year, and the *OpenHeritage* portal starts operation at the end of the first year and operates throughout the second half of the project.

Therefore, the workplan will encompass both R&D implementation and application validation/demonstration. Given the very deep integration of the user groups into the R&D activities, we have preferred not to separate the two components of the proposal. The two areas (R&D and test beds) are nevertheless clearly identified in the workplan, while the amount of financial support asked from the Commission has been kept to 42% in order to allow for the demonstration component.

The project activities will be organised into the following main workpackages:

- A cross activity (**WP01**) encompassing the *management of the project* and dealing with consortium relations at all levels, with a special emphasis on the definition (within the first semester of the project) of comprehensive consortium agreement and exploitation agreement contracts;
- A set of *user relations activities* (**WP02**). During an initial phase, early in the project, these cover the determination of *user requirements*, the focusing of the socio-economic model and the clarification of all contractual issues related to the temporary acquisition of rights on museum assets. This activity area, that precedes the tasks related to technology development and integration, is followed at a later stage in the project by corresponding *validation activities*, where models, applications and services are analysed (with the verification of modular collections management technology) and applied to significant test beds encompassing the application of territorial models, the deployment of the Territorial Service Centres and the setup and operation of the *OpenHeritage* portal.
- A set of technological tasks (**WP03**) that deals with the four main development and integration activities: the development of dynamic solutions for the creation of *computable models* of territorial CH scenarios; the development of an innovative *collections management solution* based on novel concepts of modularity, interactivity, content management and user-orientation; the deployment of territorial ASPs for the management and valorisation of CH (the *Territorial Service Centres*); and the development of a modern *global portal* for the exploitation of the European CH mixing entertaining community features with advanced *business-to-business* services for the trading of rich interactive media.

- Business-oriented activities (**WP04**), encompassing the completion and verification of the *business plan* for the initiative, the research for *venture capital and business opportunities*, active *marketing policies* to foster the diffusion of local technological systems (thus feeding the portal with images and rich media) and the planning of comprehensive *advertising and promotional campaigns* to support the launch of the `openheritage.com` enterprise. Also covered here are co-ordinated information dissemination activities, as described in part C of this proposal.

The thematic structure of the workplan can be resumed by the following table:

Thematic area	WPs	Tasks	Activities
1 System requirements and validation through test beds	WP2 1st phase	3	Assessment of socio-economic and technological requirements. Contractual issues
	WP2 2nd phase	2	Technical validation of the collections management solution. Overall system validation through territorial (3 areas) and thematic (rich media, portal) test beds
2. System development and integration	WP3	4	R&D activities involving applied research and the integration of existing enabling technology in 4 core areas
3. Exploitation and dissemination	WP4	3	Business planning, financial engineering, marketing activities, advertising and promotional campaigns, information dissemination activities
4. Cross	WP01	2	Project management and consortium relations

The four main WPs are furthermore divided into tasks in order to manage the various activities of the project. While a more detailed subdivision into separate WPs could have been used, we have preferred to apply the WP heading to the four core activity lines, resorting to tasks for detail. This conveniently stresses the tight relationship between the activities within the main project areas, while keeping the overall project structure simple and easier to read.

The *OpenHeritage* project will be carried out over **a two-year period**, with a first year more involved with system specification and R&D development, and a second year oriented towards field testing, solutions tuning, information dissemination/promotion and industrial exploitation. This relatively tight time plan (2,5 years including project evaluation and contract negotiation) is due to the swift pace of *new economy* processes, that require immediate response and fast time-to-market capabilities.

According to the above analysis, the project tasks will fall into three major (overlapping) phases to which relevant milestones apply:

- **Phase 1 (M1-M6)** – *User requirements, technological modelling, business modelling specification*. This phase covers an in-depth survey of the technological baseline and the analysis of user requirements. At this time the groups of participant museums are organised into Interest Groups, defining specialisation and competence profiles (Archaeology, Ethnography, Natural History, etc.). The project objectives are discussed with the final users and formalised in a detailed action plan. Co-ordination activities see the definition of consortium and exploitation agreements, while the *OpenHeritage* business plan is detailed and verified with prospective investors

  Milestones: *Requirements analysis; Contractual framework; Consortium and exploitation agreements; Business plan*

- **Phase 2 (M6-M19)** - *Co-operative development and technology integration*. This phase is devoted to the development and integration of innovative technological solutions (in the four major development areas identified by the project). Two interim progress reports are issued; the `openheritage.com` enterprise is started, with the support of a major dissemination event.
  Milestones: *Modelling software prototype; Collections management software prototype; Territorial Service Centres prototype; Portal prototype; Start of the openheritage.com enterprise; Major dissemination event; Progress Report 1; Progress Report 2*
- **Phase 3 (M12-M24)** – *Testing, validation and full-scale commercial operation.* The project solutions are tested through activities involving the technical assessment of the *OpenMuseum* collections management technology and the deployment of significant test beds in the territorial domain (with the operation of three prototypes of Territorial Service Centres) and in the domain of rich CH media for the portal operation. During this phase the project partners will also be directly involved into information dissemination and promotion activities.
  Milestones: *Validation Report for CM technology; Validation Report for the territorial and thematic test beds; Final Report*

6.2 Project activities

The following sections detail the objectives, the methodology and the expected results of each of the main implementation activities of the workplan.

Project management (including consortium relations) activities are covered in section C5 of the proposal, and will not be described here. The same applies to the activities related to business planning, promotion and dissemination, that are described in detail in section C8.

The description will therefore deal with the following main implementation tasks:

Tasks	Activities
T2.1/2.2	*Requirements analysis (divided into T2.1 - Requirements for the modular CM system and T2.2 - Requirements for territorial and on-line components)*
T2.3	*Economic model and contractual framework*
T3.1	*Development of dynamic modelling software*
T3.2	*Development of an innovative modular CM solution*
T3.3	*Design and prototyping of advanced Territorial Service Centres for the CH system*
T3,4	*Design and prototyping of an innovative CH portal*
T2.4/2.5	*Validation activities (divided into T2.4 - Technological validation of the CM solution and T2.5 - Validation of territorial and thematic test beds)*

T2.1/2.2 Requirements analysis

The analysis of requirements within the *OpenHeritage* project will involve three main different categories of "users":

- The cultural heritage institutions that will use the *OpenHeritage* system to give access to their collection information and virtual presentations, to manage their in situ multimedia presentations or to commercialise their CH media to publishers and multimedia industries.
- In a broader sense, the bodies in specific regions that use the *OpenHeritage* System to promote cultural tourism.

- The end users that visit websites that are generated by *OpenHeritage* or virtual presentations of cities, users of the online catalogues or WAP services.

For the task of capturing requirements use will be made of the experiences from the RESPECT project (*Requirements Engineering and Specification in Telematics*), that was organised within the Telematics Application Programme and ended in 1997.

In the process of capturing requirements three different phases will be distinguished:

- User context analysis: in this phase a first set of requirements will be defined, based on an analysis of the museum group in the project, followed by brainstorming sessions.
- Feasibility and prototyping: in accordance with the advice from the RESPECT project *OpenHeritage* will follow a strategy of early prototyping (paper prototypes, software prototypes, scenario building, storyboarding). Refinements of the earliest sets of requirements will be based on prototype evaluation. Instruments that will be used in this phase will be mainly group discussions, brainstorming sessions, in-depth interviews.
- User requirements synthesis: in this phase the requirements identified in the first two stages will be integrated in a concept description, general system characteristics, system functions, user interfaces, user support needs, physical and organisational characteristics, usability goals and the approach for installing the system.

T2.3 Economic model and contractual framework

As described above in section B5, the project will pursue the substantive integration of memory institutions into a *culture economy* model where cultural assets help create, through effective and sustainable exploitation channels, the resources that are needed to support innovation and to transform CH into a major economic strength and an ubiquitous social resource.

To implement this core idea, the model requires that suitable local technology be introduced into memory institutions in order to ensure the production of high-quality digital media archives on a significant scale. It also foresees the convergence of museums (and libraries/archives), with special regard to clusters of smaller territorial institutions, towards the services of TSCs ensuring the necessary management and valorisation services throughout the local districts. This will enable the effective marketing of a host of local cultural and touristic services, with relevant economic and occupational results (and revenue streams from both users and local operators and administrations).

At a higher level, the TSCs will feed a global *OpenHeritage* portal with images and other value-added digital CH media, enabling an international business venture that targets the media industries, the publishing sector, general purpose portals, tour operators and the multimedia for education world.

One of the key elements in this comprehensive value chain is the possibility of stipulating time-limited renewable agreements with memory institutions that make the rights on the digital contents (and the institutional identity, i.e. the name and physical appearance of the museum or archive for the creation of 3D virtual institutions) available to the *OpenHeritage* enterprise for its business purposes. In return, the institutions will receive:

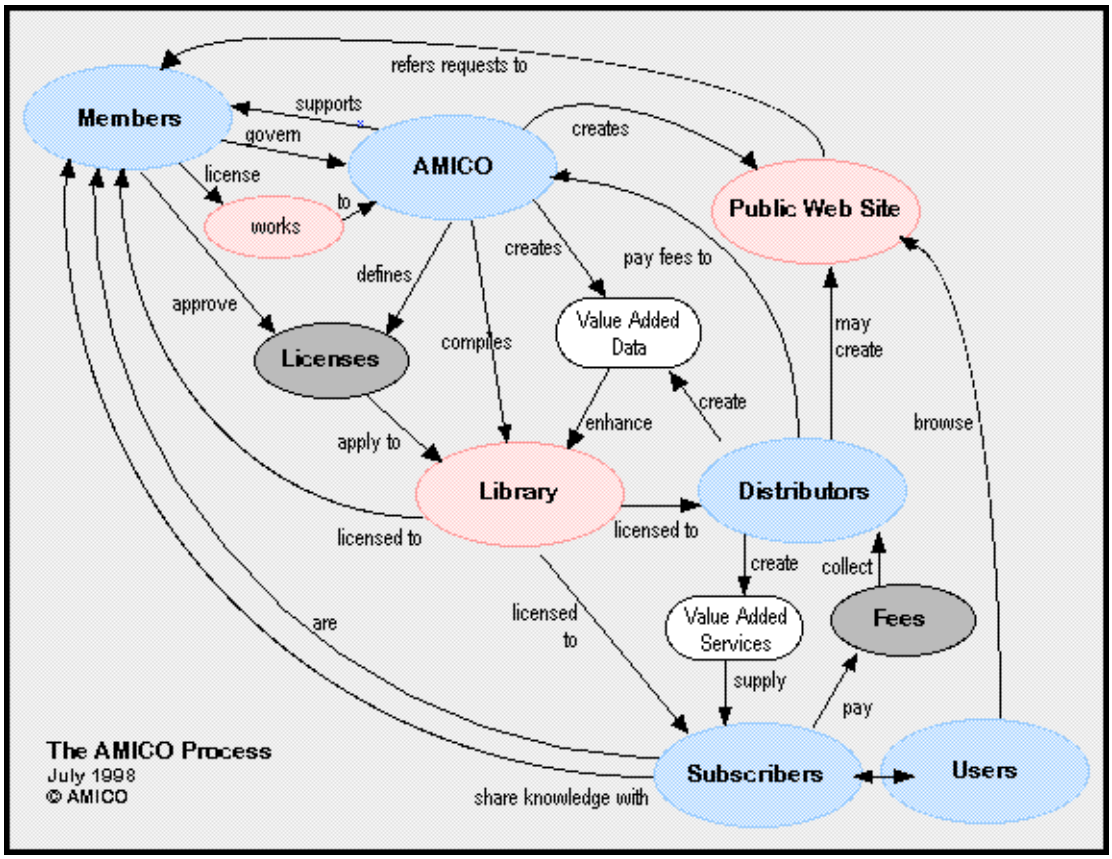
- Access to a base version of the *OpenMuseum* technology for a very low price (in the order of 5 KEURO per year over a 5-year period);
- Creation of contacts and opportunities to make them benefit from free manpower to support the digitisation and content authoring processes. To attain this, *OpenHeritage* will certify a host of territorial partners, mostly no-profit organisations, who will receive support (tax-deductible charitable money) from local administrations, banks and foundations to operate according to OH's specifications;

- Technical and scientific support in the digitisation of their collections;
- Access to the hosting, maintenance, support, transactional and promotional services of the Territorial Service Centres;
- Limited royalties on the revenues generated through the valorisation of their assets.

It has to be noticed that one of the most daunting problems, i.e. the purchase of hardware for the *OpenMuseum* system, can in fact be easily tackled when this strategy in pursued in a systematic way and reaches momentum and visibility.

Bringing ICT hardware into museums is today mostly a problem of defining – through costly consultancy services – the right configuration and setup: hardware itself is a relatively cheap commodity that can easily be financed by local actors or even donated by philanthropy programs of multinational vendors such as Hewlett Packard. The coordinating organisation of this proposal, for instance, has recently developed a large "Museum Territory" project with the municipality of Alghero in Sardinia working in synergy with a substantive HP donation. Aim of *OpenHeritage* is therefore the certification of "turnkey" hardware configurations that can be made available to museums through inexpensive volume purchases and large-scale, planned donations or special bids.

The licensing model is being defined with the support of primary legal consultants: a basic infrastructure has already been drafted, but significant customisations to fit the different European realities is still needed. In the process, the consortium is looking at any best practice in the field: for instance, the process enforced by the AMICO initiative (see the picture below) and the relative documentation, although limited to the educational sector, is deemed to be very interesting and will be leveraged as much as possible. The regulation of the so-called "additional services" in State-owned museums in Italy also represents an useful reference and is being considered.



T3.1 Development of dynamic modelling software

Since several years, corporate skills such as *site location management* (finding a suitable location for new industrial operations) and socio-economic dynamic models applied to local areas have grown into a more comprehensive discipline (**territory analysis**) enabling a better understanding of the vocations, capabilities and resources of local districts, with a potentially strong impact on growth policies and an improved return (e.g., in employment terms) on territorial investment.

The project coordinator has been involved for several years in implementing and applying territory analysis techniques in a number of contexts in European regions (e.g., the Melfi area in southern Italy). Aim of the present task is the application of this methodology and of the supporting tools to the vertical sector of territorial cultural and touristic systems.

In detail, aim of the task is:

- The deployment of dedicated **tools and network services for the acquisition and management of data** on the territorial CH with a special emphasis on the S-E relevance of the cultural, natural and 'tourist-attraction' assets within local systems. The information will be geographically and thematically referenced by means of a GIS system connected to an advanced, multimedia-savvy database engine.
- The development of **dynamic, computable models of the territorial CH resources**. Tools and services will be applied to the creation and the continuous feeding of models enabling the geographical and thematic interpretation of cultural resources and the dynamic evaluation (rating) of the potential of the territorial CH. By referring to an existing *Strategic Atlas of Europe* (that will be implemented by updating the information sets related to CH) the models will enable the confrontation (benchmarking) with competing territorial systems. Dedicated software will make it possible to compute the territorial models and to perform thematic analysis and strategic simulation sessions.
- Development of **solutions and network services** to support cultural and administrative operators in developing plans for the recovery, valorisation and promotion of CH and touristic resources in close connection with the forecast results provided by the models.

In the frame of the project, territorial models will be developed for the three main territorial test beds (the areas of Sardinia, Rhône-Alpes and the Scottish Border) and for two 'special' locations (the The Hague and Florence areas) which, although not real territories in the usual meaning of the term, represent very significant CH locations and will help test the modelling approach on well-defined, high-attraction CH poles characterised by high touristic flows.

T3.2 Development of an innovative modular collections management solution

CM solutions have first appeared in museums since before the diffusion of personal computers, and have seen a very large adoption (at least in English-speaking countries, Canada and part of central Europe: countries such as Italy, in spite of their significance for CH, have an extremely scarce penetration of these systems) since the diffusion of inexpensive and easily manageable microcomputers. The same applies to libraries, where catalogue management systems and on-line public access catalogues (OPACs) have seen several subsequent generations of computing platforms and models.

In spite of (or possibly because of) their maturity, though, these solutions have mostly concentrated on the management and data-crunching aspects of collections management, with very little attention to promotion, communication and interactive multimedia features. Those systems that show some of this functionality (see the survey in section B5) have mostly introduced user access and Web access modules as an addition to consolidated solution platforms.

In parallel with the diffusion of these database-driven, curator-oriented CM products multimedia in museums has long been identified with CD-ROM stations or kiosks, where more or less significant multimedia productions - with no durable connection with the museum collections and services - rapidly drift into technical and information obsolescence. Mostly created by external structures, stand-alone off-line media hardly integrate with a museum's real life and impact, and are very soon felt as a foreign body. The decade-long dynamics of CD-ROM success and decline, which has brought to the current plethora of cheap discs sold at news-stands and supermarkets, has largely inhibited alternative, fresh approaches towards a more systemic and meaningful use of multimedia resources inside memory institutions.

The presence of CH multimedia on the Web is today, for different reasons, equally ineffective. Web identities are mostly those of the relatively few primary European museums, whose main concern is the siege of millions of visitors and tourists. Their focus is on virtual visits through sophisticated forms of virtualisation and network access to collections. Moreover, by providing virtual "metamuseums" (where assets from several museums are available side by side) Web systems often blur the identity of individual institutions, thus cancelling a laborious historical evolution through which nobility, scholarship and taste have given body to museums as they now are. Virtualising visits also worsens a situation where – e.g., in the Italian scenario - 90% of all visitors stress the 20 most eminent museums, and the remaining 10% are hunted for by nearly 3.000 museums, most of them far from tourist circuits and neglected, with heavy consequences for the museums themselves and for the surrounding territories.

The lack of a systemic approach to multimedia communication inside memory institutions, in spite of diverse advanced experiments in several major museums all over the world, is also witnessed by user interfaces, that are generally quite unintuitive and though to master for the mass public. An ideal system will stress and valorise local collections and peculiarities, while resorting, in as much as possible, to a standardised, easy to recognise and to master interface where users can immediately glimpse the functionality offered and reckon on a distinct *family feeling* when going from one museum to the other.

OpenHeritage recognises, on one side, the increasing importance of **making museums an entertaining and user-oriented visit experience**, especially in less-famous, thematic territorial circuits; on the other side, this project aims at establishing the crucial missing link between memory institutions and their potential exploitation front end in the *new economy* market. This requires the **completion of the multimedia value chain** with a significant penetration inside memory institutions of standardised CM solutions based on rich interactive media and customer-oriented communications services.

The approach that will be pursued by the *OpenHeritage* consortium envisages the integration and restructuring (towards an innovative network computing architecture and state-of-the-art metadata structures) of two existing complementary CM solutions developed by partners C01 and P02:

- **Solution 1**, an integrated engine for collections management and public access in museums and archives (extensively validated in several installations in the UK) based on a text and multimedia database system with Web facilities;
- **Solution 2**, a modular system for setting up multimedia digital museums and for the local and remote access to museum collections and multimedia presentations, with several reference installations throughout Italy.

The resulting new solution, whose provisional name is *OpenMuseum*, will offer a standards-based, efficient and proven server core while providing effective, modular and customisable interactive multimedia front ends and a centralised content management and access setup system that leaves curators in control of their exhibitions.

Solution 1 is a comprehensive CM system consisting of a CM database and data entry system to catalogue the collections in line with emerging international standards for museum documentation. Images and other multi-media elements are held in standard formats and are fully integrated in the system. Accession, Inventory, Catalogue, Group, and Image records for each object include structured fields, with indexes and controlled term lists including hierarchical thesauri as required.

Solution 1 follows today the MDA Spectrum standard for data structures and procedures and is based on custom search and retrieval software. All data is acquired and stored following open standards so that it can be considered as a primary digital resource capable of being repurposed for future electronic projects. Formal and *de facto* international standards are implemented as appropriate. Controlled term lists and hierarchical thesauri such as the Getty Art and Architecture Thesaurus are integrated to ensure compliance with terminology standards. Access and presentation can be via standalone or networked server/client systems. Web and Z39.50 gateways allow access on the Internet or on a museum-wide Intranet.

Solution 1 functions (see the architecture picture in the drawing below) encompass:

- *Collection Management,* supporting accessioning, inventory management and cataloguing with full data and security requirements.
- A *Photograph Library Management* system supporting image acquisition and cataloguing with *e-commerce* capabilities.
- *Terminology* for developing and managing hierarchical and flat authority files to support terminology control for data entry and to support thesaurus-based retrieval.
- *Open Access*. Providing open access via the Internet or via internal Intranets - supports the Web (HTTP) or Z39.50 protocols with Web Gateway and Z39.50 Gateway.
- A *Gallery* system to support the creation of high-quality multimedia access facilities, sharing the CM database or in stand-alone mode, via Web, kiosks, workstations or CDs.
- *Information retrieval from digital repositories* based on powerful indexing and retrieval algorithms, providing a full range of indexing and search facilities with thesaurus, dictionary and other authority support, access control and security facilities.

Solution 2, the technology developed by the project coordinator, is a patented “turnkey” multi-modular solution for setting up innovative museum systems, based on digital technology and interactive multimedia methods for the representation of museum collections and for their local and remote access. The system (based on market standards and open software tools) allows museums to acquire an industrial “package” in standardised form that makes it possible (through an appropriate customisation and configuration of application templates) to define, structure and implement in hardware, software and contents the whole range of facilities and applications required for the development of an innovative museum system with strong user-centred functionality for access and interaction.

Solution 2 includes several specialised access modules, encompassing a *Welcome Terminal*, a *Videowall* system, a local and Internet-based *Booking Terminal*, a main *Multimedia Station* for interactive presentations (accessing media in real time from the central server store), an *Interactive 3D Station* for interfacing interactive VR models, a *Digital Video* terminal deploying MPEG-1 or MPEG-2 video, a *GIS Station* for the interactive access to territorial mapping systems, and many more. Among these it also features a specialised *Digital Library* station (developed in the frame of the TELEMATICS project "BAMBI"), by means of which digital documents (e.g., illuminated manuscripts) can be browsed and analysed, with the support of advanced text matching, annotation and hyperlinking functions.

The main goal of **Solution 2** is the **promotion of physical memory institutions by means of modular technology** assisting the user throughout the phases of the visit. There is therefore a direct complementarity with the database-oriented, curatorial functionality that is the main focus of **Solution 1**.

Most of the present modules of **Solution 2** will be integrated into *OpenMuseum* by means of a new *Java*-based architecture served by the **Solution 1** core and enabling seamless access to and management of museum collections both locally and from remote.

The following drawing pictures the expected results of the revision and integration of **Solution 1** and **Solution 2** technology into *OpenMuseum*.

The main features of the resulting integrated *OpenMuseum* system will be:

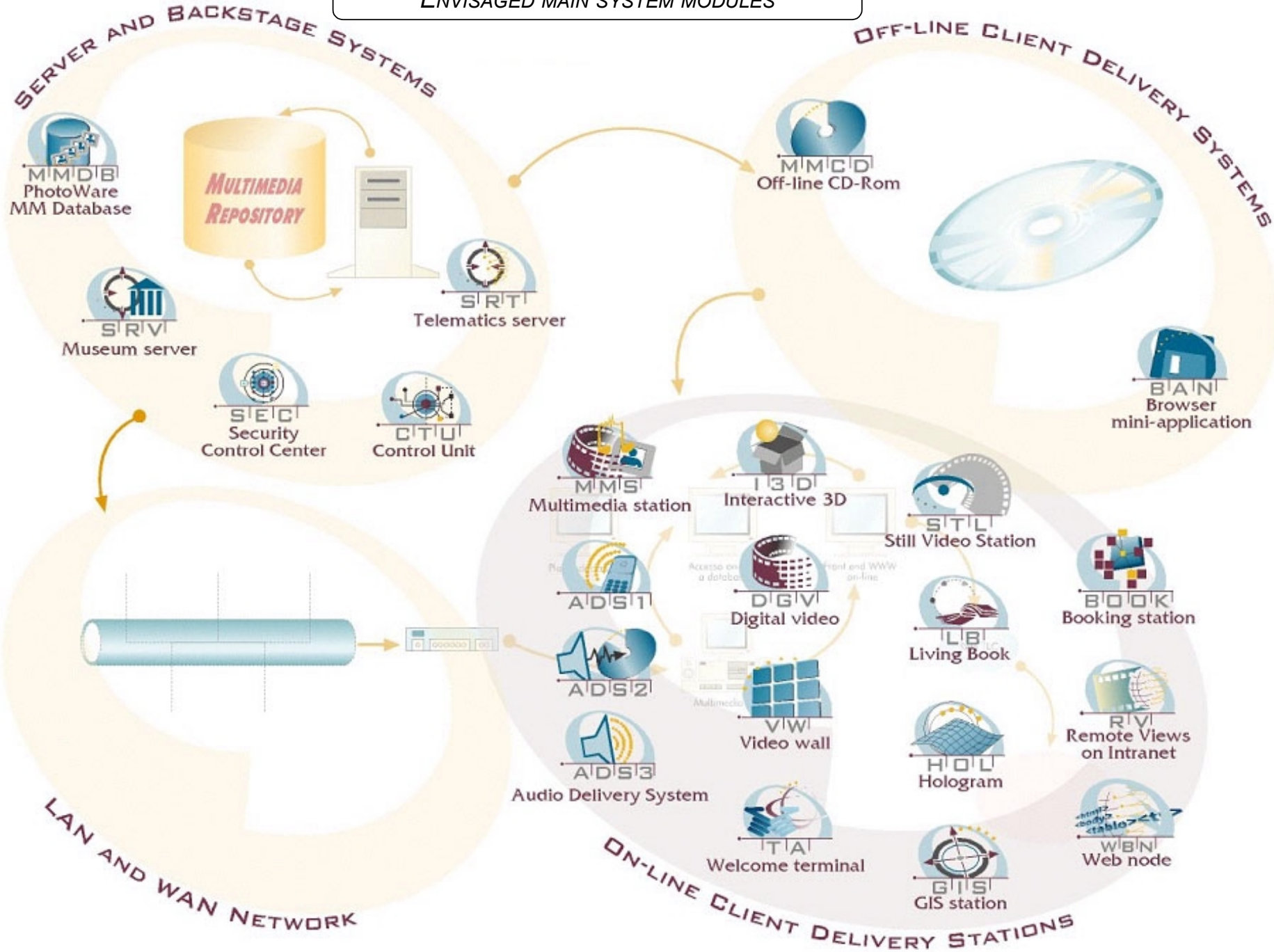
- An object-oriented CM core (interoperable with *industry standard* RDBMS engines) resorting to standard indexing and metadata structures such as the MDA Spectrum, the Dublin Core and the EAD DTD and employing standard thesauri and reference dictionaries such as the ULAN (Getty Union List of Artists names), the AAT and the Garnier subject indexing system;
- A metadata architecture open to the issues of interoperability between collections, by means of open standards such as the "Bath Profile" for Z39.50 and the ICE[1] (Information and Content Exchange) protocol implemented in XML;
- Advanced image storage and protection techniques such as the ISO JTIP, ISO JPEG2000 and IBM *Cryptolope*® technologies;
- An advanced network computing architecture based on ubiquitous Intranet and Internet concepts and on a *Java*/CORBA technical infrastructure;
- The client support for a supervision and content management architecture based on an advanced network and system management framework such as IBM *Tivoli*;
- A flexible multi-modular system for local and remote client access based on several different and specialised access modules located throughout the museum and connected by means of a high-speed network;
- A pervasive advanced multimedia architecture for the network environment based on the integration of dynamic multimedia engines such as Macromedia *Generator* (2D), IBM *HotMedia* (2D/3D) and *Superscape* (3D);
- An open framework for the generation and description of rich interactive content and object reproductions based on open formats such as *HyTime* and on commercial XML protocols and DTDs such as ICE and the Document Type Definitions (XML DTDs) defined in the frame of Microsoft *BizTalk*, of AMICO and the CIMI initiatives.

The *OpenMuseum* technology will be tightly linked with the functions of the TSCs: the metadata structures will be designed for interoperability, there will be support for a distributed *e-commerce* framework encompassing physical art reproductions and other merchandising goods, and all local systems will comply with a common system and network management framework. The TSCs will therefore effectively represent a territorial server structure on which the individual memory institutions will rely for the most complex management and promotional/transactional services.

[1] Information & Content Exchange (ICE) is a protocol designed to significantly reduce the cost of doing networked business online and increase the value of business relationships by facilitating the controlled exchange and management of electronic assets between networked partners and affiliates. The ICE specification provides businesses with an XML-based common language and architecture that will facilitate the process of automatically exchanging, updating, supplying and controlling assets, such as content without manual packaging or knowledge of remote Web site structures.

OPENMUSEUM

ENVISAGED MAIN SYSTEM MODULES



The CM system (for which high-quality multimedia contents will be produced according to OH-certified guidelines) will offer provision for the integration with existing CM systems, in order to facilitate upgrading existing installations and to allow different CM systems to benefit from the network services of the TSCs. Partner P02 played a central role in the European AQUARELLE project (http://aqua.inria.fr/) which developed several technologies of relevance to *OpenHeritage*. These technologies will be evaluated and incorporated where appropriate.

- A Z39.50 profile (http://www.lcweb.loc.gov/z3950/agency/profiles/) was developed jointly by the AQUARELLE project and the international CIMI consortium (http://www.cimi.org/). The profile allows diverse museum databases, including collections management systems from different manufacturers, to be accessed in a uniform way using standard non-proprietary protocols.
- The project developed an Access Server which provided many of AQUARELLE's services including parallel distributed searching, multi-lingual terminology resources, and user profiling.
- The AQUARELLE "folder" is a document representing a virtual museum exhibition or a virtual museum collection: a discursive work referencing museum objects, collections, and other folders. The folder notion offers a model and a demonstrator for *OpenHeritage*'s user-oriented delivery.

T3.3 Design and prototyping of advanced Territorial Service Centres for the CH system

As described above, among the core enablers of the *OpenHeritage* architecture will be a number of technological territorial infrastructures, that will operate as Service Centres supporting memory institutions throughout the network management of the local technical facilities and the interaction with local and remote customers (for information, booking, tourist guidance and *e-commerce* services).

The first of the drawings below depicts the relationship between the main building blocks of the *OpenHeritage* architecture, from territorial models (which provide essential operating and promotional parameters to the Centres) to local technology for memory institutions (enabling the creation of valuable contents) to the TSCs operating as a support/exploitation infrastructure with a focus on the territorial CH. The network of TSCs in turn feeds a global exploitation portal (the `openheritage.com` enterprise) which pursues the exploitation of European CH according to advanced *new economy* criteria.

The following drawing explodes the functionality that will be offered by the TSCs. At the centre there is a modern ASP core (implemented by means of the system architecture described in the third scheme) operating through the Internet and resorting to a modern, network-centric architecture based on *Java*/CORBA and on ubiquitous browser interfaces.

Building on this core, the TSCs will offer six main functionality areas:

- **Technical facilities management services** for memory institutions, encompassing system and network management (by deploying the server functions of an advanced framework such as *Tivoli*), remote control, distance training, interconnectivity and load balancing services for seamless distributed access, and storage services for sensitive digital media using advanced security systems and formats such as IBM *Cryptolopes* or PADS (provided by partner P11).
- **Distributed catalogues and indexing systems** for the seamless access to all the collections contained in the territorial memory institutions. The TSCs will provide interoperability of catalogues held in museums (and libraries/archives) by harmonising the semantics for the descriptions of collections. In synergy with the criteria followed by *OpenMuseum*, the meta-collections handling system in TSCs will resort to Dublin Core metadata[2] to enable Cross Domain searches and to the Z39.50 Bath Profile for OPAC interoperability.

[2] Consortium for the Computer Interchange of Museum Information (CIMI). *Guide to Best Practice: Dublin Core (DC 1.0 = RFC 2413), Final Version*, 12 August 1999

OPENHERITAGE

THE MAIN FUNCTIONAL COMPONENTS

MODELLING

- Analysis of local CH assets
- Socio-economic rating
- Benchmarking and positioning in the European scenario

- Dynamic models of the territorial CH

'IN-SITU' TECHNOLOGY

- System 'A' (server technology)
- Unified solution
- System 'B' (multimedia technology)

Enhanced services to visitors

Advanced 'local' technology for Museums and DLs

CONTENT

- Raw content (images, video, etc.)
- Pre-processed high quality content
- Editorial content

CH SUPPORT/EXPLOITATION INFRASTRUCTURE

TECHNICAL FACILITIES MANAGEMENT

TERRITORIAL SERVICE CENTER

DYNAMIC CUSTOMISATION

Delivery channels (telephone, Web, WAP, DAB...)	Customer relationships management (Call Center, etc.)	Real-time guide throughout the territory	Virtual museums and virtual places	Booking services, e-commerce, advertising

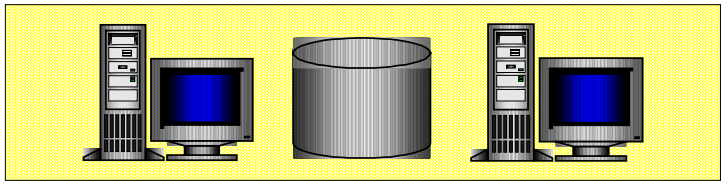
OPEN HERITAGE: EUROPEAN CH PORTAL

Industrial culture ecomony actors

- Users inside region
- Remote users
- Off-line media

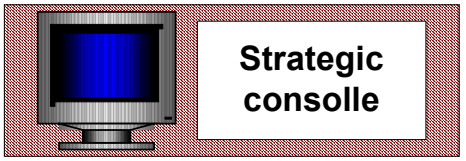
OPENHERITAGE

FUNCTIONS OF THE TERRITORIAL SERVICE CENTRES



Syst. & network manag.	Remote control & training	WAN services	Storage & database managmt.

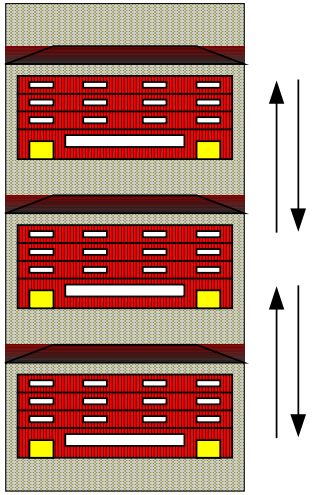
TECHNICAL FACILITIES MANAGEMENT FOR CH INSTITUTIONS



POLICY MAKERS

ACCESS VIA INTRANET/INTERNET

META-COLLECTIONS



CRM SERVICES

Multi-channel customer access			
Call Center	Web support services	Booking services	Smart guide services
One-to-one profiling service			

2D/3D ACCESS PORTAL (WEB, WEBTV, WAP, ...)

COMMUNITY (OPEN HIGH-VOLUME SERVICES)

Image galleries and virtual museums	Guide to museums and cultural lifestyle	Tourist guides and services	Fora, e-commerce, advertising & auctions	Iconogr. research

VALUE-ADDED CULTURAL CONTENT

Image brokering	Tradizional and electronic publishing	Media-ready pre-processed content	Portal-ready pre-processed content	Couseware content for education

CULTURAL TOURISM: NAVIGABLE VR HISTORICAL CITIES

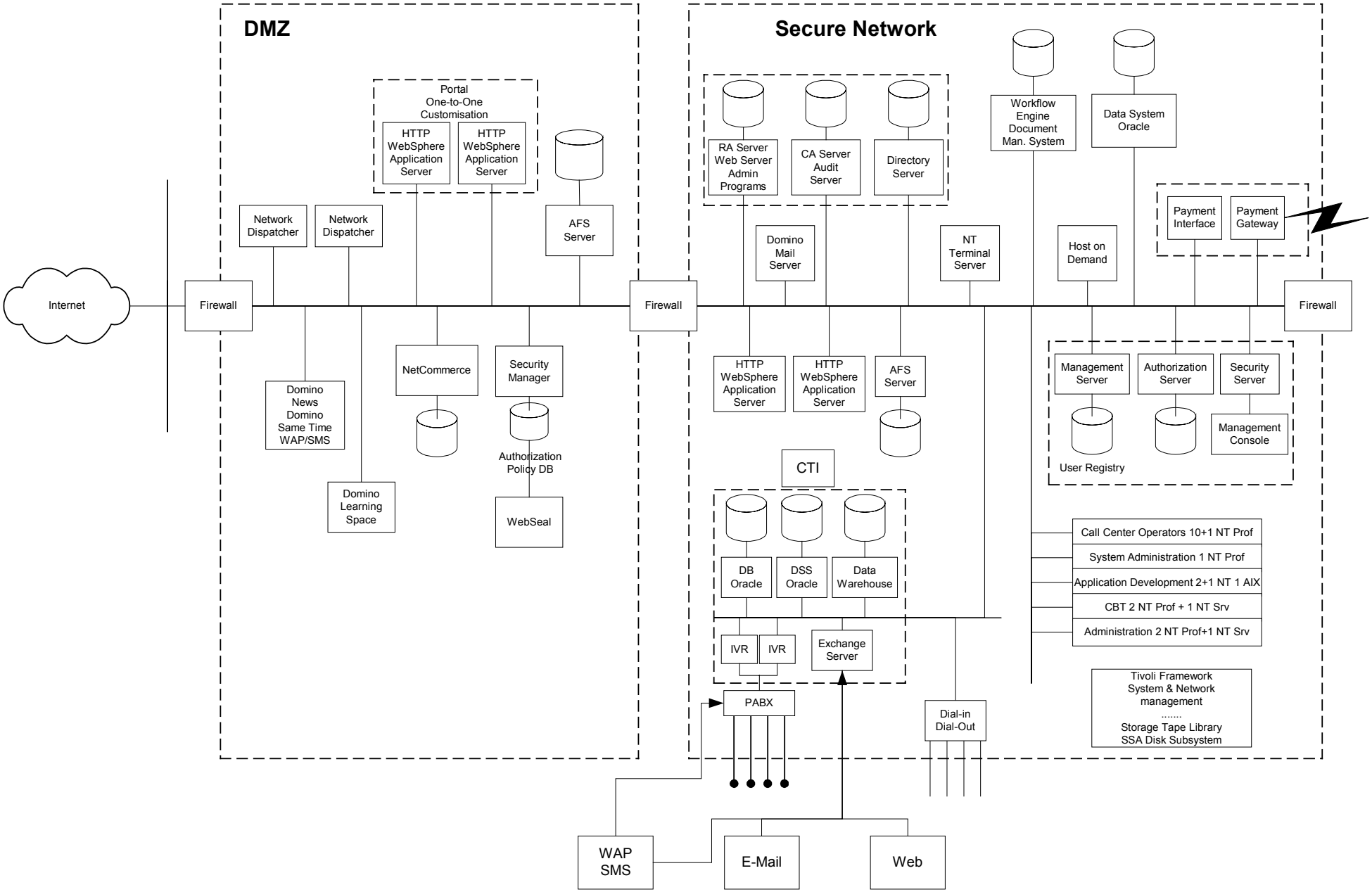
DELIVERY AND PROMOTION SERVICES

Trusted financial services		
MMCR	E-business intelligence	User directory services
Workflow management engine		

LICENSING SERVICE

OPENHERITAGE

OVERALL TECHNOLOGICAL STRUCTURE OF THE TSCS



- **Strategic monitoring systems** for the supervision of the vital parameters of the territorial CH system, to the benefit of local policy makers.
- **A secure transactional engine** resorting to established *e-business* (B2B) and *e-commerce* (B2C) technology, and encompassing a Management and Clearance of Rights service (MMCR), *Javabeans* components implementing the necessary business logic, a directory (using an LDAP server) of authorised users at the different access levels, a connection to a trusted *e-payment* service (*Cash on the Net*) and an embedded workflow management system for the management of the transactional pipeline.
- **Customer Relationship Management services** enabling users to reach the TSCs though several concurrent channels (an unified territorial 800 telephone number; Web; WAP, e-mail; WebTV, etc.) and to be supported by a Call Center, by interactive Web assistance and follow-up services, by interactive booking services and by real-time tourist services guiding customers to the most convenient locations and institutions according to their present location and interest profile. All CRM functions will be coordinated by a common user profiling engine, that will determine and dynamically manage interest profiles (enabling the generation of *on-demand*, personalised views on the contents and services of the TSCs) and will match them with the models of territorial CH resources.
- A **public portal** enabling access to free or almost-free community services and leisure areas on CH topics and featuring a restricted-access area for value-added, B2B services. This component of the architecture, focused on delivery and promotional services, will represent the local version of the global on-line portal services that will be made available and widely promoted by the `openheritage.com` enterprise. Accessible through different media, the **community** area of the portal will offer entertaining and informative services such as the browsing of image galleries, guided visits to virtual museums, critical and anecdotical information on museums and cultural lifestyles, tourist information and guiding hints, user fora, on-line advertising, an on-line catalogue for the choice of images and other goods (including the whole range of art reproductions and other merchandising goods), on-line auctions on CH-related assets and basic iconographic research and analysis functions. The **commercial Extranet area** (that will be more developed in the global portal) will feature comprehensive image brokering services and functionality for the trading of rich media assets: contents for traditional and electronic publishing, for thematic television, for Internet portals and for educational businesses.

The core promotional feature of the TSCs will be oriented to the cultural tourism business and will be based on **navigable interactive representations of 3D virtual art cities and locations**. The concept is based on the availability of advanced, high-performance (but relatively easy to implement and to use) real-time 3D representation engines (such as the one by Blaxxun Interactive, that will power the virtual Renaissance court in the IST RENAISSANCE project, or the engine by Active Worlds) that enable the creation of navigable and very realistic virtual locations.

The TSCs will host such representations for the main art cities, villages, archaeological and naturalistic areas of their territories, at different scale levels, in order to allow to-be tourists to explore the locations from remote and to orient themselves (e.g., from their hotel rooms or inside the TSCs) once they are travelling. Each city model will be populated by hotels, restaurants, theatre and of course by memory institutions, enabling on one side a broad range of transactional and booking activities, and on the other the virtual visit of local institutions (which will anyway preserve their physical appearance and the contextualisation within their territory and historical framework).

Such advanced and extremely user-friendly interface (which includes the capability to freely roam spaces in 3D and to chat and interact in real time with the other virtual visitors, through the server hosted by the TSCs) represents a very effective **community building tool** as encouraged by the Action Line description.

It will effectively support touristic flows and increase tourist satisfaction, helping territories deploy their best potential. The 3D world will reflect the strategic recommendations emerging from the territorial models developed for each location according to the methodology described above.

The interactive contents of the TSCs will of course be repurposed for the development of off-line productions such as CD-ROMs and DVDs. According to market requests, the TSCs will possibly develop editorial offices producing thematic CD-ROMs *on-demand* through the combination (along pre-defined multi-level templates) of the available rich media objects.

T3.4 Design and prototyping of an innovative CH portal

The global `openheritage.com` portal will offer a one-stop-shop, on a global scale, to all the contents and customer services hosted by the TSCs at the territorial level. The portal will mostly stress B2B services; it will be powered by state-of-the-art Internet technology and will build on the previous experience of Partner P07, since 4 years the European best practice for the on-line promotion and commercialisation of visual CH and tourism-landscape media.

The on-line system, that will be significantly enhanced from its present status, will extend its reach beyond the trading of image rights, to encompass a broad range of multimedia, editorial and educational services centred on Cultural Heritage. It will be based on international best practises and on the use of resources such as the Union List of Artist Names (ULAN), the ICONCLASS and Garnier unified subject indexing lists, and international standards such as the ISO JPEG2000 standard for image storage, access and registration, certificates-based secure transactions, etc.

P07's system presently targets commercial electronic publishing applications as a packager, conveyer and broker of museum images and related products. Its goals and objectives are to assist cultural institutions by networking and marketing their images to the public at large, educational and cultural institutions, and the commercial sector. The system completed its development phase within a major ESPRIT project over 1997-1998. Its on-line catalogue reaches now about 100,000 images from various sources. A detailed description of P07 activities is given in Part C of the proposal, section C7.

Building on this expertise, P07 will lead the development of the *OpenHeritage* portal, that will mirror most of the features and services offered by the community areas of the TSCs while providing advanced commercial services for the trading of images and rich media:

- A smooth service infrastructure enabling B2B transactions as well as B2C small-volume sales;
- A capable and fault-tolerant database management engine enabling the storage of XML structured data for media definitions and tracking the entire supply chain from memory institutions to TSCs and to local stores;
- *Java*-based business logic implementing the related business processes and functions up to the delivery of digital and physical goods;
- The integration of best-practice *e-commerce* transactional systems resorting to XML for the exchange of business data and enabling fault-tolerance, load balancing and server clustering;
- The integration and optimisation of existing state-of-the-art components, standards, and methods for distributed search and retrieval;
- The use or modification of existing XML DTDs for the description of objects and collections (e.g. AMICO, or CIMI-based) as well as products;
- The development of XLS stylesheets for data presentation in online or printed form (e.g., dedicated or personalised catalogues);
- The integration of a customer relationship management system based on *industry-standard* RDBMS systems and on *best practice* DSS (Decision Support System) technology;

- The development of a dedicated Internet auction system offering dynamic bidding features and the corresponding marketing services;
- The integration of a dynamic system for the management of on-line advertising;
- The implementation of a legal framework for all business transaction at the B2B and B2C level;
- The integration of portal management and content management solutions based on the latest Internet technology (enabling the real-time editing of portal data with the use of simple data entry forms, with no impact on the graphical presentation of information).

The portal will be implemented in a very early stage of the project and will continuously benefit from the interaction with the other system components being developed in parallel. Its public launch is foreseen before the end of the first project year, and will be highlighted by a major dissemination event.

T2.4/2.5 Validation activities

The project validation activities, encompassing both technical validation tasks (at the *OpenMuseum* CM solution level) and the validation of the on-line operations (TSCs and Portal), will be organised as follows:

- The **usability evaluation** of the collections management solution (*OpenMuseum*), carried out by the four partner museums with the support of the six external, indirectly funded museums. The validation is carried out on a thematic basis, with one museum being responsible of the verification of *OpenMuseum* in each of the main thematic application areas (Ethnographic, Archaeological, Social, Scientific and Fine Arts museums).
- Evaluation of the **test beds**, which is in turn divided into the validation of the **territorial test beds** (encompassing the verification of the territorial models and the validation of the services of the TSCs) and the validation of the **thematic test bed**, centred on the topics of rich media authoring, description, distribution and exploitation. The organisation is as follows:
  - The validation of the three *regional test beds* (in the Scottish Border area, in the Rhône-Alpes area and in Sardinia) is managed by the project partners P02, P03 and P04 respectively in the UK, in France and in Italy, with the support of the Group C (external not-funded) museums. Each test bed coordinator is responsible for his test bed, including the management of the external museums (i.e., the validation involves managing territorial models and Territorial Service Centers);
  - The validation of the *thematic test bed* (which will encompass the validation of the functionality and services provided by the `openheritage.com` portal) is centred on digital media assets and targets the media industry. It is coordinated by partner P06 in The Netherlands, with the support of some of the Group C museums.

The validation of the *OpenHeritage* solutions will be carried out within the framework of the user Focus Group, organising extensive usability trials.

For this purpose state-of-the-art evaluation methods will be used:

- SUMI 2.0, which is compliant to the ISO 9241 standard and monitors the user appreciation of the quality of a computer application, or:
- MUMS, that adds some elements to SUMI but is still in an experimental phase.
- WAMMI, which is a useful diagnostic tool as well as a measurement tool related to the usability of websites.

The methods are questionnaire-based, to be complemented with selective in-depth interviews.

Referring again to the RESPECT approach, for this user group the first release of the *OpenHeritage* system will function in fact as a tool for capturing the user requirements for the further development of the system as a full instrument for the promotion of cultural tourism, including booking services for hotels and events. In this way already in an early stage a sound basis for the exploitation of the system as a complete tool for the promotion of cultural tourism will be established.

The regional bodies like the Foundation for the Promotion of The Hague and the Ente Regionale Industrie Turistiche in Sardinia will play an important role in the Focus Group. In this way they will be actively involved in the validation process. The end-users will also be involved as early as possible in the project. As soon as the first working prototypes are online, end users will be invited to take part in the evaluation process (territorial applications will be tested by actual visitors/foreign tourists through an adequate mechanism). For this purpose the already mentioned WAMMI method will be used.

6.3 The Consortium

The core of the *OpenHeritage* consortium is composed of two software companies, one in Italy and one in the UK, which provide complementary museum solutions; of a well-know commercial Internet-based broker of CH images established in Luxembourg; of a higher-education Centre in Southern Italy specialised in the themes of territory development and sustainable growth; and of a private no-profit Cultural Service Centre established in Austria, delivering innovative ICT services to memory institutions.

The project also sees a large involvement of CH institutions to ensure the viability of the solutions and their successful exploitation. A cross section of the European CH institutions is represented as a Focus Group:

- clustered in five different countries;
- with collections of local or regional to collections of national or international importance;
- covering different domains: art history, history and archaeology, literature, science and technique, ethnology, natural history.

To ensure a smooth management of the project only four CH organisations participate as full partners. They are the centre of a larger "interest group" within which two different subgroups can be distinguished:

- a small group that will prepare multimedia presentations of their collections, using the *OpenMuseum* technology, and will directly contribute to the validation of the system;
- a larger group of institutions that will be involved in the trials involving the territorial and thematic test beds.

Each of the four museum partners is responsible for the co-ordination of the part of the Focus Group in its own region. The overall coordination of the user-related work will be carried out by one of the partners, appointed WP Manager.

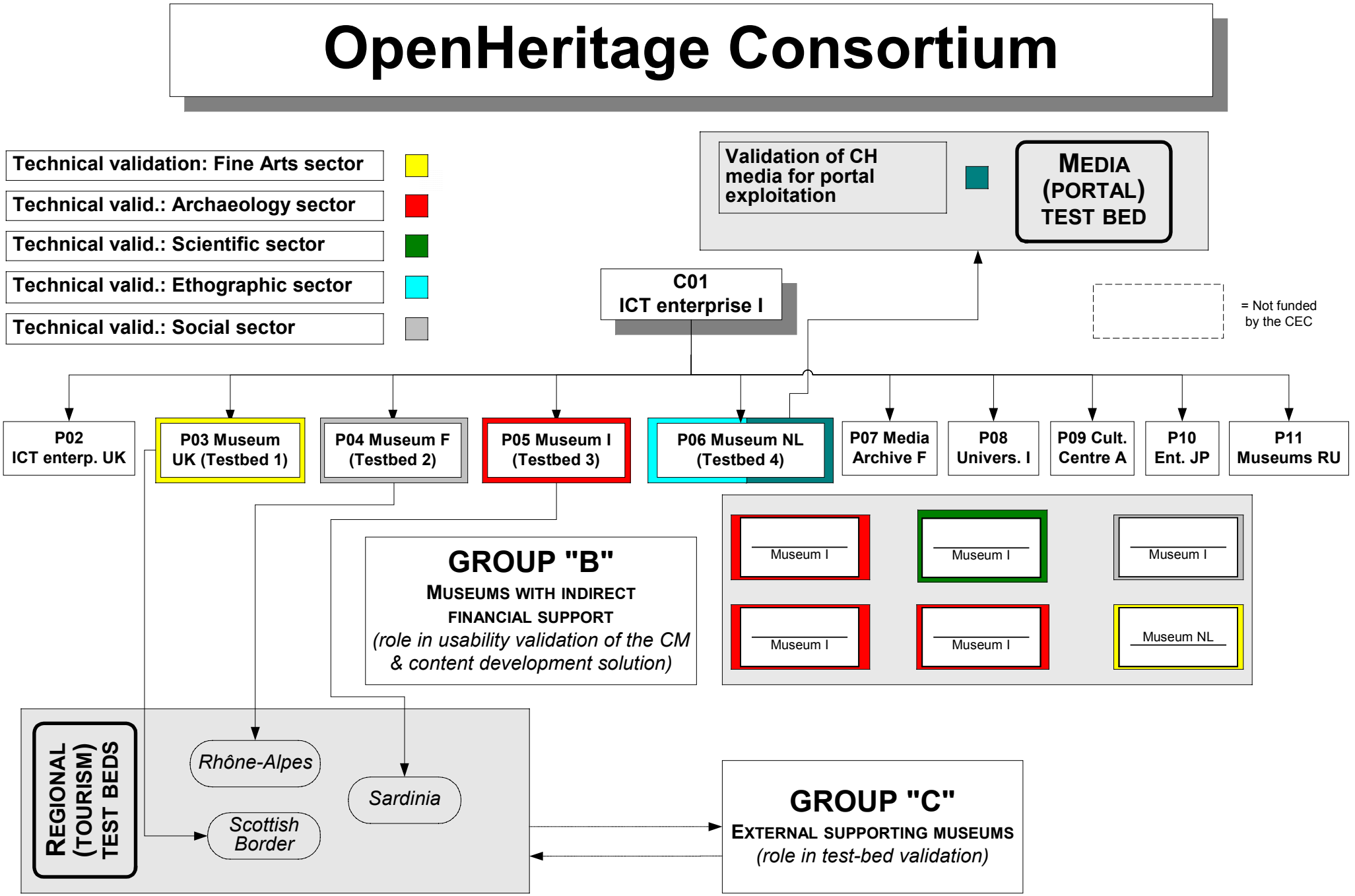
Memory institutions supporting the project comprise:

- The four museum partners ("Group A");

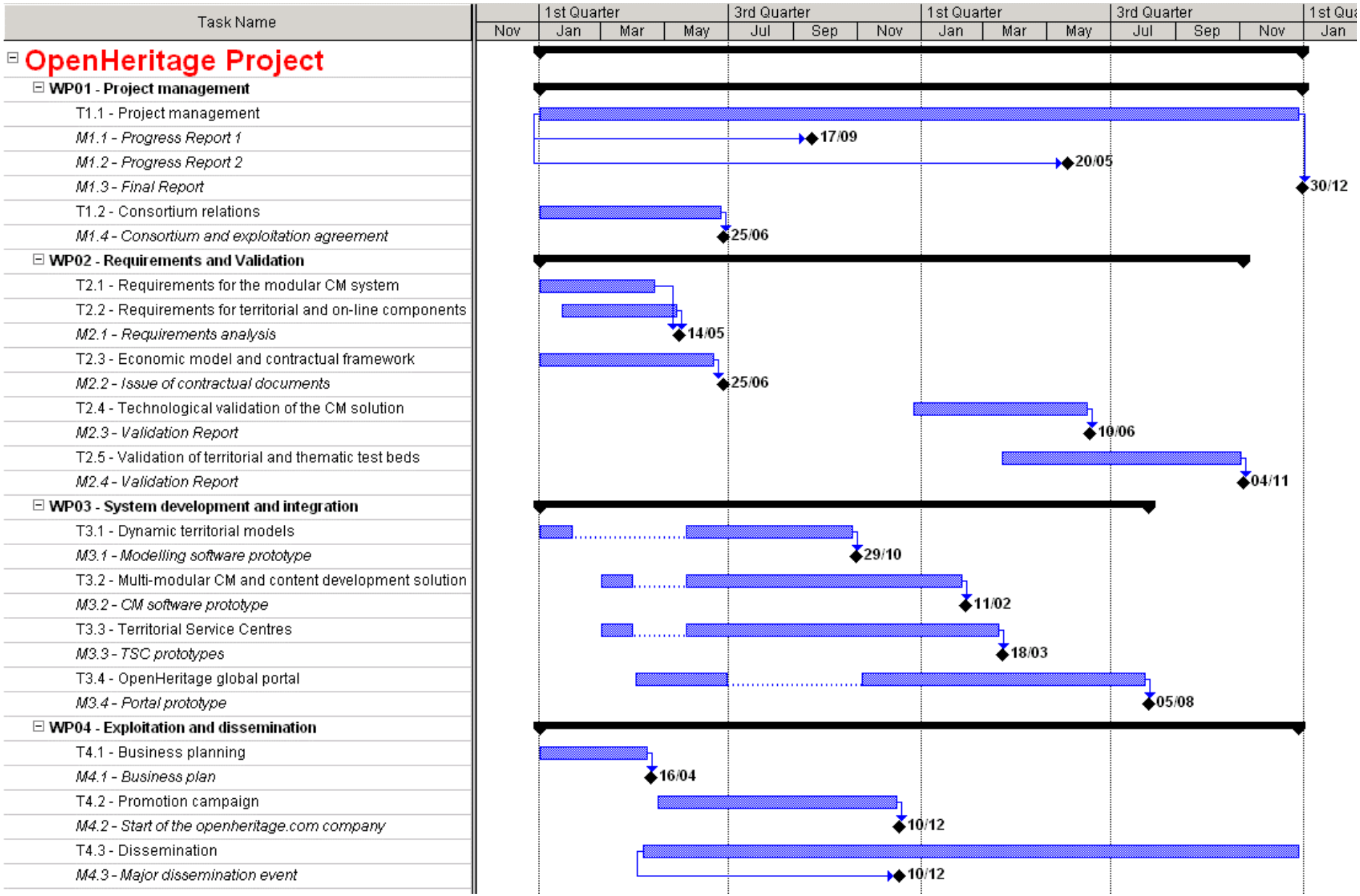
- The six "Group B" museums (federated as external supporting organisation, but indirectly funded[3] through services paid by the four museum partners): they support the museum partners in the field testing of the collections management solution and in the tuning of the activities related to the acquisition of rich multimedia contents;
- The 20 "Group C" (external not-funded museums receiving free software and support): they will provide sample information enabling their participation to the test-beds for specification and validation activities. These include 6 museums in Sardinia (coordinated by museum P05, in order to shape the Sardinia Territorial test bed), 5 museums in the UK (coordinated by museum P03, for the Scottish Border test bed), 5 museums in France (coordinated by museum P04, for the Rhône-Alpes area test bed), one museum in Spain and 3 museums in The Netherlands (coordinated by museum P06, contributing to the thematic test bed on rich media).

The consortium also offers provision for international co-operation, with a strong attention to the involvement of major potential markets outside Europe: Japan (through the involvement of a company active in the field of digital publishing) and Russia (by means of the partnership with a group of major State museums).

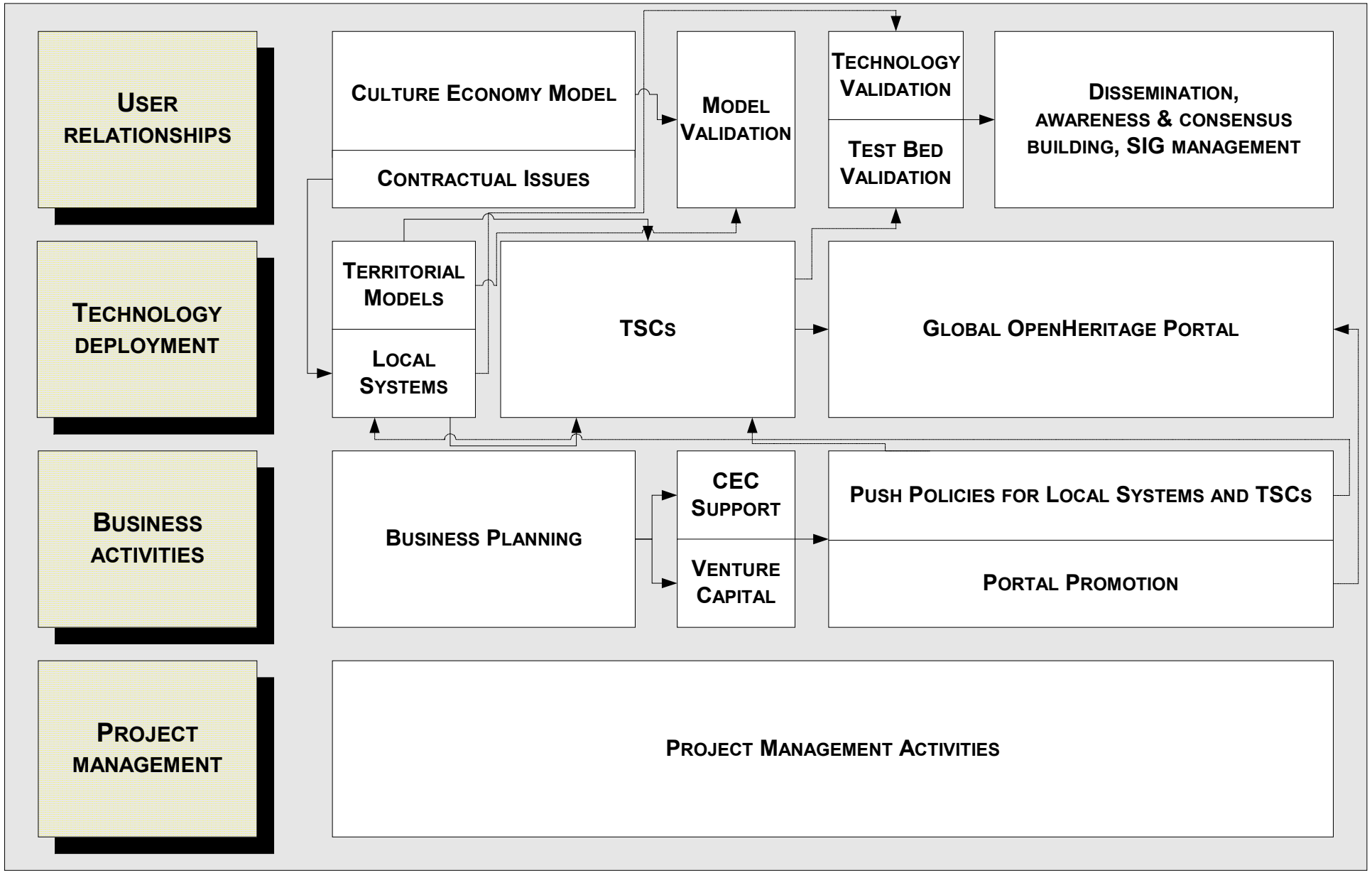
[3] An approximate budget of 300.000 EUROs (100% financed) from the budget of the four museum partners has been allocated to services and activities in favour of the six Group B museums. While these will not directly receive any resources, therefore, they will be indirectly funded in order to be able to better support the project (while keeping the overall management structure simple).


OpenHeritage Consortium
Technical validation: Fine Arts sector
Technical valid.: Archaeology sector
Technical valid.: Scientific sector
Technical valid.: Ethographic sector
Technical valid.: Social sector
Validation of CH media for portal exploitation
MEDIA (PORTAL) TEST BED
C01 ICT enterprise I
= Not funded by the CEC
P02 ICT enterp. UK
P03 Museum UK (Testbed 1)
P04 Museum F (Testbed 2)
P05 Museum I (Testbed 3)
P06 Museum NL (Testbed 4)
P07 Media Archive F
P08 Univers. I
P09 Cult. Centre A
P10 Ent. JP
P11 Museums RU
GROUP "B"
MUSEUMS WITH INDIRECT FINANCIAL SUPPORT
(role in usability validation of the CM & content development solution)
Museum I
Museum I
Museum I
Museum I
Museum I
Museum NL
REGIONAL (TOURISM) TEST BEDS
Rhône-Alpes
Sardinia
Scottish Border
GROUP "C"
EXTERNAL SUPPORTING MUSEUMS
(role in test-bed validation)

6.4 Project planning and time table



6.5 Graphical presentation of the project components



6.6 Detailed project description

B1. Workpackage list

WP No[4]	Workpackage title	Lead contr - actor No[5]	Person-months [6]	Start month[7]	End month[8]	Phase[9]	Del. No[10]
1	Project Management	01	48	0	23		1, 2 3, 4
2	Requirements and Validation	06	116	0	22		5, 6, 7, 8, 9
3	System development and integration	02	152	0	19		10, 11, 12, 13, 14, 15, 16
4	Exploitation and dissemination	07	80	0	23		17, 18, 19
	TOTAL		**396**				

The detailed distribution of manpower resources and the actual responsibilities at the task level are highlighted in the following set of tables.

The first table resumes the global allocation for the four main WPs (WP leaders are in bold). The following four tables analyse WP subdivision into tasks (task leaders in bold).

[4] Workpackage number: WP 1 – WP n.
[5] Number of the contractor leading the work in this workpackage.
[6] The total number of person-months allocated to each workpackage.
[7] Relative start date for the work in the specific workpackages, month 0 marking the start of the project, and all other start dates being relative to this start date.
[8] Relative end date, month 0 marking the start of the project, and all end dates being relative to this start date.
[9] Only for combined research and demonstration projects: Please indicate R for research and D for demonstration.
[10] Deliverable number: Number for the deliverable(s)/result(s) mentioned in the workpackage: D1 - Dn.

Project Manpower and Responsibilities breakdown

Code	Partner	m/ms	WP1	WP2	WP3	WP4	*Totals*
C01		104	**24**	6	54	20	*104*
P02		55	4	6	**36**	9	*55*
P03		24	2	12	4	6	*24*
P04		24	2	12	4	6	*24*
P05		24	2	12	4	6	*24*
P06		60	2	**42**	10	6	*60*
P07		42	4	2	18	**18**	*42*
P08		12	2	6	2	2	*12*
P09		12	2	6	2	2	*12*
P10		24	2	3	16	3	*24*
P11		15	2	9	2	2	*15*
	Totals	*396*	*48*	*116*	*152*	*80*	*396*

WP01 - Project management
- *T1.1 - Project management*
- *T1.2 - Consortium relations*

WP02 - Requirements and Validation
- *T2.1 - Requirements for the modular CM system*
- *T2.2 - Requirements for territorial and on-line components*
- *T2.3 - Economic model and contractual framework*
- *T2.4 - Technological validation of the CM solution*
- *T2.5 - Validation of territorial and thematic test beds*

WP03 - System development and integration
- *T3.1 - Dynamic territorial models*
- *T3.2 - Multi-modular CM and content development solution*
- *T3.3 - Territorial Service Centres*
- *T3.4 - OpenHeritage global portal*

WP04 - Exploitation and dissemination
- *T4.1 - Business planning*
- *T4.2 - Promotion campaign*
- *T4.3 - Dissemination*

Code	Partner	WP1.1	WP1.2	*Totals*
C01		**18**	**6**	*24*
P02		2	2	*4*
P03			2	*2*
P04			2	*2*
P05			2	*2*
P06			2	*2*
P07		2	2	*4*
P08			2	*2*
P09			2	*2*
P10			2	*2*
P11			2	*2*
	Totals	*22*	*26*	*48*

Code	Partner	WP2.1	WP2.2	WP2.3	WP2.4	WP2.5	*Totals*
C01		2	2	2			6
P02		4	2				6
P03		3	3		3	3	12
P04		3	3		3	3	12
P05		3	3		3	3	12
P06		**8**	**8**	2	**12**	**12**	42
P07				**2**			2
P08				6			6
P09			3			3	6
P10			2		1		3
P11		2	2		3	2	9
	Totals	*25*	*28*	*12*	*25*	*26*	116

Code	Partner	WP3.1	WP3.2	WP3.3	WP3.4	*Totals*
C01		**9**	12	**24**	9	*54*
P02			**24**	8	4	*36*
P03			2	2		*4*
P04			2	2		*4*
P05			2	2		*4*
P06		2		6	2	*10*
P07				4	**14**	*18*
P08		2				*2*
P09				2		*2*
P10			6		10	*16*
P11			1	1		*2*
	Totals	*13*	*49*	*51*	*39*	*152*

Code	Partner	WP4.1	WP4.2	WP4.3	*Totals*
C01		4	**8**	8	*20*
P02		3		**6**	*9*
P03			3	3	*6*
P04			3	3	*6*
P05			3	3	*6*
P06			3	3	*6*
P07		**9**	4	5	*18*
P08				2	*2*
P09		1	1		*2*
P10				3	*3*
P11				2	*2*
	Totals	*17*	*25*	*38*	*80*

B2. Deliverables list

Del. No[11]	Deliverable title	Delivery date[12]	Nature[13]	Dissemination level[14]
D01	Progress Report 1	8	R	PP
D02	Progress Report 2	16	R	PP
D03	Final Report	23	R	PP
D04	Consortium and exploitation agreement	5	O	CO
D05	Requirements Report for the collections management/content production system component	4	R	CO
D06	Requirements Report for the territorial and on-line system components	4	R	CO
D07	Contractual documents	5	O	CO
D08	Validation Report for the collections management/content production system component	17	R	CO
D09	Validation Report for the territorial and on-line system components	22	R	CO
D10	Modelling software prototype	9	P	CO
D11	Collections management/content production software mock-up	3	P	CO
D12	Collections management/content production software prototype	13	P	CO
D13	Territorial Service Centre mock-up	3	P	CO
D14	Territorial Service Centre prototype	14	P	CO
D15	Portal mock-up	5	P	CO
D16	Portal prototype	19	P	CO
D17	Business plan	3	O	CO
D18	Industrial plan of the `openheritage.com` company	11	O	CO
D19	Dissemination activities Report	23	R	PP

[11] Deliverable numbers in order of delivery dates: D1 – Dn

[12] Month in which the deliverables will be available. Month 0 marking the start of the project, and all delivery dates being relative to this start date.

[13] Please indicate the nature of the deliverable using one of the following codes:

R = Report
P = Prototype
D = Demonstrator
O = Other

[14] Please indicate the dissemination level using one of the following codes:

PU = Public
PP = Restricted to other programme participants (including the Commission Services).
RE = Restricted to a group specified by the consortium (including the Commission Services).
CO = Confidential, only for members of the consortium (including the Commission Services).

B3. Workpackage description

Workpackage number: 1	*Project management*											
Start date / starting event:	Month 0											
Participant number:	**01**	02	03	04	05	06	07	08	09	10	11	**T.**
Person/m per participant:	**24**	4	2	2	2	2	4	2	2	2	2	**48**

Objectives

- To ensure the overall management of the project;
- To ensure the coherence and effective activity of the Consortium and tight relationships within the OH partners, with the Focus Group and with the Commission services;
- To specify the cooperation framework for Consortium activities and to establish the exploitation plan for the commercialisation of the solutions.

Description of work

- To prepare - at an early stage- a feasibility study and contingency plan, outlining potential alternatives in case the realisation of specific technical components should fail;
- To co-ordinate the project activities and continuously check them against the project objectives;
- To ensure the needed information and communication between partners;
- To prepare/maintain the project master schedules, to signal the due dates to the interested WP Leaders and to establish and practice a Quality System;
- To continuously monitor the expenditure profiles against the technical progress and the schedules;
- To collect, organise, edit and submit to the Commissions all the contractual deliverables;
- To call and chair the project internal meetings, to prepare and call the progress review and auditing meetings and to provide the minutes;
- To effectively manage the relationships with the Strategic Board and the Management Board.

Deliverables

D01 Progress Report 1, *report*
D02 Progress Report 2, *report*
D03 Final Report, *report*
D04 Consortium and exploitation agreements, *contracts*

Milestones and expected results

M1.1 *Progress Report 1* $\Rightarrow$ Delivery of the initial Progress Report and Cost Statement
M1.2 *Progress Report 2* $\Rightarrow$ Delivery of the second Progress Report and Cost Statement
M1.3 *Final Report* $\Rightarrow$ Delivery of the final Progress Report and Edited Report
M1.4 *Consortium and exploitation agreements* $\Rightarrow$ Delivery and acceptance of the core agreements regulating Consortium relations and exploitation procedures and policies

Workpackage number: 2	*Requirements and Validation*											
Start date or starting event:	Month 0											
Participant number:	01	02	03	04	05	**06**	07	08	09	10	11	**T.**
Person/m per participant:	6	6	12	12	12	**42**	2	6	6	3	9	**116**

Objectives

- Define the technological and usability requirements for the collections management and content development solution for memory institutions;
- Define the technological and usability requirements for territory modelling software, for TSC services and for the global OH portal system
- Validate all solutions and continuously improve them through the close relationship with a Focus Group of memory institutions
- Define the contractal framework enabling OH to provide memory institutions with inexpensive and advanced solutions and services in exchange for exploitation rights

Description of work

- Define early prototypes or operational mock-ups in order to enable user groups to start the specification according to the RESPECT model
- Produce verified and detailed specification reports for all the major system components
- Acquire the state of the art in legal models regarding the cooperation of private subjects with memory institutions and provide subsequent drafts of a possible contractual framework regulating the cooperation
- Perform usability validation of the collections management/content development solution in specific thematic areas with the support of a group of specialised museums
- Perform the technological and usability validation of the territorial models, the TSCs and the global OH portal with the support of the Focus Group of memory institutions
- Evaluate and consolidate validation results according to the SUMI 2.0 (ISO 9241 standard), MUMS or WAMMI models

Deliverables

D05 Requirements Report for the collections management/content production system component, *report*
D06 Requirements Report for the territorial and on-line system components, *report*
D07 Contractual documents, *contracts*
D08 Validation Report for the collections management/content production system component, *report*
D09 Validation Report for the territorial and on-line system components, *report*

Milestones and expected results

M2.1 *Requirements analysis*⇒ Definition of the requirements for the main system components
M2.2 *Issue of contractual documents*⇒ Delivery and acceptance of the core agreement regulating the use of rights on the CH assets in memory institutions
M2.3 *Validation Report* ⇒ Technological and usability validation of the collections management and content development solutions
M2.4 *Validation Report* ⇒ Technological and usability validation of the territorial modelling, TSC and portal solutions

Workpackage number: 3	*System development and integration*											
Start date or starting event:	Month 0											
Participant number:	01	**02**	03	04	05	**06**	07	08	09	10	11	**T.**
Person-months per participant:	54	**36**	4	4	4	**10**	18	2	2	16	2	**152**

Objectives

- To utilise dynamic economic models to evaluate economic impact of proposed system on tourism and employment in the regions involved;
- To build a software and service infrastructure to enhance public access to information about regional museums and their collections;
- To create Territorial Service Centres to assist regional museums to utilise and exploit the software and service infrastructure;
- To create an *OpenHeritage* portal website to provide a point of access to all OH resources

Description of work

- Adapting existing economic model to use Cultural Heritage and tourism data to prioritise development actions within the different regions;
- Bringing together existing collections management and public access software tools and methods and integrating these to form a modular *OpenHeritage* infrastructure with coherent application building and user interfaces. The main components are P02's CM solution and content development systems and C01's CM modules. Elements from the AQUARELLE architecture will be assessed for incorporation;
- Working with regional authorities and museum groups to configure and implement Territorial Service Centres. These will provide a range of support services, including an ASP capability;
- Working from an established model, for example P02's infrastructure for the 24 Hour Museum, create a prototype portal for *OpenHeritage* allowing global access to *OpenHeritage* resources.

Deliverables

D10 Modelling software prototype, *prototype*
D11 Collections management/content production software mock-up, *prototype*
D12 Collections management/content production software prototype, *prototype*
D13 Territorial Service Centre mock-up, *prototype*
D14 Territorial Service Centre prototype, *prototype*
D15 Portal mock-up, *prototype*
D16 Portal prototype, *prototype*

Milestones and expected results

M3.1 *Modelling software prototype*⇒ Delivery of an innovative software solution for territorial modelling, rating and simulation
M3.2 *CM software prototype*⇒ Integration and delivery of an innovative collections management solution with strong user access and interaction features
M3.3 *TSC prototype* ⇒ Delivery of an innovative software and hardware architecture for network service infrastructures supporting territorial CH institutions
M3.4 *Portal prototype* ⇒ Delivery of an innovative portal architecture for the on-line exploitation of CH according to the *new economy* model

Workpackage number: 4	*Exploitation and dissemination*											
Start date or starting event:	Month 0											
Participant number:	01	02	03	04	05	06	**07**	08	09	10	11	**T.**
Person-months per participant:	20	9	6	6	6	6	**18**	2	2	3	2	**80**

Objectives

To start-up a company that will effectively develop and operate the *OpenHeritage* solutions, and for this final aim:

- To specify the exploitation framework for *OpenHeritage* deployment and to establish the Business Plan and the Marketing plan for the commercialisation of OH solutions;
- To promote the *OpenHeritage* open solutions as well as its portal towards Museums, Archives and Libraries, and towards CH and Tourism administrations, local authorities, experts and associations to meet consensus at the international level for the *OpenHeritage* business model and to rapidly acquire a large customer base.
- To disseminate information on OH towards the players on the CH scene internationally through participation into conferences and fairs, through an Internet forum and a newsletter

Description of work

The WP has been divided in three main tasks in order to efficiently set up and support the start up of the `openheritage.com` company before the end of the project.

- **Task 4.1. Business Planning**. To complete - at an early stage - a detailed business plan in order to capture the business opportunities and to attract potential investors at regional, national and international levels for starting-up the `openheritage.com` enterprise, to negotiate with financial investors minority shares in order to keep the control of the company for the social benefit of Europe, and to launch the company after successful negotiations;
- **Task 4.2. Promotion activities**. To promote actively the *OpenHeritage* solutions by meeting the main players of the CH scene and the national and regional policy makers, demonstrating the validity of the OH solutions. A marketing plan will support promotion activities, that will primarily focus on UK, France, Italy and The Netherlands. Promotion activities will also target international institutions such as the UNESCO, ICOM, and the Bureau International du Tourisme as they should be early supporters for the adoption of the *OpenHeritage* model;
- **Task 4.3. Dissemination activities**. To widely disseminate information about the *OpenHeritage* offer to the CH community in order to ensure early adopters of the technology within the institutions. This dissemination will be done by means of participation to conferences, workshops, seminars and specialised fairs such as the MILIA and the Frankfurt Book Fair. Dissemination will be also directed to the tourism sector in Europe in order to involve the players in this field and to demontsrate the potential of OH solutions in leveraging regional tourism.

Deliverables

D17 Business plan, *planning document*
D18 Industrial plan of the `openheritage.com` enterprise, *industrial plan*
D19 Dissemination activities Report, *report*

Milestones and expected results

M4.1 *Business Plan*⇒ Issue of the *OpenHeritage* business plan
M4.2 *Promotion campaign*⇒ Deployment of major promotional activities supporting the OH strategy
M4.3 *Major dissemination event* ⇒ Deployment of the major dissemination activities, in coincidence with the official launch of the `openheritage.com` enterprise