

Foreword

Information and communication technologies are developing at a breath-taking pace. They represent the foundation of the coming Information Society which will establish completely new structures in economy and society. This process is chiefly characterised by the globalisation of communication and of all activities linked to it.

National frontiers are losing their significance. We are becoming global players, and services and goods can be produced in any part of the world. At the same time there is no aspect of human life and no group in society which is not affected by the new information networks and their potential for growth, wealth-creation and prosperity.

In order to exploit this potential we urgently need international cooperation at all levels and on all factors which impede the full development of the Information Society.

In view of this challenge the German government has always placed great emphasis on global cooperation. This was reflected in its active role in the Global Information Society initiative taken by the G 7 Heads of State and Government at the summit meeting in Naples in July 1994 and at the subsequent Ministerial meeting in Brussels in 1995 which launched eleven pilot projects for the Global Information Society.

I am delighted to present the final report on this work to the public on the occasion of the Cologne G 8 summit meeting, which is being held under the German presidency.

The pilot projects are an impressive demonstration of the potential of the Information Society in many areas, such as commerce, culture, education, the environment, health and public administration. They have led to the establishment of new structures of cooperation which will remain effective even after the end of the pilot phase. The involvement of a growing number of Non-G 8 countries, including developing countries, was one of the most encouraging aspects of the projects, as was the participation of representatives from industry and research.

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With an enhanced exchange of information and experience the work has raised awareness of potential applications and of policy requirements. The projects have also yielded more tangible results like memoranda of understanding and have given an impetus for standardisation and the development of new goods and services.

This was done without any new institution or new funding: the process relied on the goodwill and the commitment of the participants.

I hope that the global cooperation to which the pilot projects have contributed, can be further developed and extended.

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June 1999

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The G 8 Global Information Society Pilot Projects

Final Report

The information society is developing at a rapid pace. It is changing the way business is done in the private and public sectors and is having real impact on the lives of citizens. The Global Information Society initiative taken by the G7 Heads of State and Government at its summit meeting in Naples in July 1994 and the subsequent Ministerial meeting in Brussels in 1995 with the launching of eleven pilot projects has catalysed thinking and action for the information society in areas such as commerce, culture, education, the environment, health and public administration. It has encouraged public and private sectors to work together and has led to new common platforms and networks for cooperation, involving industrialised and developing countries. It has stimulated the creation of markets for new products and services. A number of technical and other obstacles have been identified related to the implementation of practical applications. In some cases work will continue through collaboration in appropriate international fora.

This final report reviews achievements and future prospects.

1. Terms of reference

The pilot projects had a number of key objectives. They were set up to

- support the goal of international consensus on common principles governing the need of access to networks and applications and their interoperability;
- establish the groundwork for productive forms of cooperation among G7 partners in order to create a critical mass to address this global issue;

- create an opportunity for information exchange leading towards the further development of the information society;
- identify and select projects of an exemplary nature having tangible and clearly understandable social, economic and cultural benefits which demonstrate to the public the potential of the information society;
- identify obstacles related to the implementation of practical applications serving the creation of a global information society;
- help to create markets for new products and services, where appropriate.

Several guiding principles were agreed for selecting and implementing the project themes including:

- adding value for the development of the information society;
- being relevant to the citizen;
- stimulating cooperation;
- encouraging open access and
- bringing in other countries.

In particular, the pilot projects should not create new bureaucracies or institutions, and should be financed by existing programmes.

2. The pilot projects - Highlights of results

Global Inventory Project (GIP)

Implemented as an infrastructure of decentralised national inventories, the Global Inventory Project has established a single access point for information on approximately 4000 projects and studies on the development of the global information society. Many sites all over the world are accessible on a multilingual basis, and interest in this inventory is still growing.

Global Interoperability of Broadband Networks (GIBN)

This project has accelerated the development of globally interconnected and interoperable broadband information infrastructure, essential to the global information society of the 21st century. It demonstrated a series of advanced broadband applications, raised the general awareness of their potential and contributed to the development and deployment of advanced technology, products, services and networks.

Transcultural Education and Training for Language Learning (Tel*Lingua)

The project aimed to give producers, teachers, trainers and citizens a single access point to resources and experiences for language and transcultural learning through an international network of servers. An operational prototype was set up and helped to lay the ground for several virtual language servers. These services follow similar structures in different languages.

Electronic Libraries: Bibliotheca Universalis

This cultural project has coordinated part of the digitization programmes of the participating libraries through an agreed theme for document digitization "Exchanges between people". It also led to the establishment of a formal agreement to pursue this cooperation on organisational and technical aspects.

Multimedia Access to World Cultural Heritage

The project has coordinated the combined experience gained by each country in the field of methodological and technological standards thus enhancing the international multilanguage heritage with specific projects such as the *Multilingual Thesaurus of Religious Objects of the Roman Catholic Church*.

Environment and Natural Resources Management (ENRM)

The project created the necessary tools for establishing a “virtual library” of environmental and natural resources management using international standards for networked information, discovery and retrieval. It reached an international consensus on a Global Environmental Information Locator Service for climate change, biological diversity and other resources.

Global Emergency Management Information Network Initiative (GEMINI)

GEMINI covered through demonstration projects and conferences the areas of networks, communication, support functions and specific hazards with the aim of taking advantage of information society tools to help in emergency management on a global scale. The project has been instrumental in laying the ground for a follow-up initiative to develop a Global Disaster Information Network.

Global Healthcare Applications (GHAP)

Subprojects demonstrated how medical databases, images, health cards and computer based training material can be used internationally, and how remote second opinions in the diagnosis and treatment of cancer and heart diseases can be achieved. The project contributed to the setting of global standards.

Government On-Line (GOL)

The project focused on ways of providing on-line services to citizens. Collaboration in 32 key subject areas has resulted in shared approaches, identified best practices, and given added impetus on the development of new policies and actions around the world.

Global Marketplace for Small and Medium Enterprises (SME)

Concentrating on increased competitiveness and participation in global trade for smaller companies, the project set up an international business information network on the Web. It successfully catalysed a common vision of electronic commerce policy development around the world, supported some thirty international testbeds and published a best practice guide for SMEs.

Maritime Information Society (MARIS)

MARIS supported applications of information technologies in the maritime sector - creating synergies and new solutions for the benefit of maritime industries. The project actively contributed to standardisation in the field and established global and regional maritime information and collaboration networks.

A detailed description of all projects and their results can be found in the Annex.

3. Assessment

The G8 pilot projects succeeded in giving strong impetus to

- an enhanced exchange of information, experience and expertise in the various project areas on a global level reaching far beyond the G8 countries
- the establishment of strong cooperative links between various partners in the world leading to a substantial number of concrete projects and initiatives
- demonstrating the potential and raising the awareness of information society applications

- promoting cultural diversity and demonstrating the importance and feasibility of multilingual applications
- the worldwide establishment of physical infrastructures and applications as well as of co-operation networks
- identifying barriers regarding the implementation of applications and ways to overcoming them
- the development of new products and services.

The work has contributed substantially to the promotion of standards in information networks and has given inputs to digitise information resources and promote their dissemination.

Operative cooperation structures were established which will be kept alive after the end of the pilot project phase.

The pilot projects have given an important input to policy development and have led to international agreements.

In line with the Ministerial decision in Brussels in 1995, the pilot projects were implemented without the creation of new bureaucracies or institutions, and were financed by existing programmes.

4. Conclusions and Perspectives

The G8 Global Information Society pilot projects have successfully demonstrated the potential of the Global Information Society in areas such as commerce, culture, education, the environment, health and public administration.

They have stimulated cooperation of various actors in G8 and Non-G8 countries thus fostering a common vision and direction of information society applications.

This growing involvement of Non-G8 countries including developing countries was one of the most encouraging achievements and reflects the global character of the new information society.

The pilot projects will have a lasting effect through the establishment of cooperative structures and the continuation of various joint projects and initiatives, the generation of various inputs for discussion and negotiation in national and international fora, and the support of knowledge and technology transfer to third countries including developing countries. The continuation of these efforts should be encouraged in the appropriate national and international frameworks.

Annex

- Theme 1: Global Inventory Project (GIP)
- Theme 2: Global Interoperability for Broadband Networks (GIBN)
- Theme 3: Transcultural Education and Training for Language Learning (Tel*Lingua)
- Theme 4: Electronic Libraries (Bibliotheca Universalis)
- Theme 5: Multimedia Access To World Cultural Heritage
- Theme 6: Environment and Natural Resources Management (ENRM)
- Theme 7: Global Emergency Management Information Network Initiative (GEMINI)
- Theme 8: Global Healthcare Applications (GHAP)
- Theme 9: Government On-line (GOL)
- Theme 10: Global Marketplace for Small and Medium Enterprises (SME)
- Theme 11: Maritime Information Society (MARIS)

Global Inventory Project (GIP)

G8 Pilot Project Theme 1

Final Report

1. Purpose and Objectives of the Pilot Project

The purpose of the Global Inventory Project (GIP) was to provide a one stop facility on the World Wide Web by linking distributed national and international inventories of projects, studies and other activities relevant to the promotion and the further development of knowledge and understanding of the Global Information Society.

The objectives of the Global Inventory Project were set as the following:

- 1 To act as an international point of reference that will assist in the promotion of the Information Society,
- 2 To establish a network for the free exchange of information about national and international initiatives relating to the Information Society (electronic forum),
- 3 To promote and gain understanding of the impact of the Information Society activity on the economy, industry and society as a whole,
- 4 To foster international alliance building and multinational projects and investments.

The Global Inventory Project was launched in 1995 as a G7 Information Society pilot project, under the leadership of the European Commission (chair) and Japan (co-chair).

2. Accomplishments

The members of the G8-GIP Steering Committee agreed that the pilot service has reached the objectives and expectations: it provides a single multilingual window to a large number of projects related to the Information Society providing clear interfaces and ways to welcome further contributions and partners. Its success was achieved by a cooperative effort of the participating G8 and non-G8 countries.

The resulting Global Inventory is accessible at <http://www.gip.int>. Its original and transferable solutions add value to similar initiatives carried out by other countries. It is of interest and of use to businesses, in particular SMEs; it illustrates innovative information technologies and best practices; it is significant from an educational and training point of view; and it fosters research and development geared towards the advancement of the Information Society.

The Global Inventory is a real working system, using advanced state-of-the-art technology. It uses standard World Wide Web browsers, making it easily accessible. The GIP is designed to be a decentralised inventory; participating countries use their own national servers for their national

inventories, although the GIP server is also available as an offshore host. Each inventory is a self-contained unit with indexing and search capabilities. All indexes are combined on the GIP host to create a global master search index of all national entries based on a multilingual keyword search. Data entry is based on a common Minimum Data Set. The central server is hosted by ISAC (Information Society Activity Centre) of the European Commission, to which the individual, national inventories are linked.

The Global Inventory makes information accessible to all in several languages. At the moment, Arabic, French, German, Italian, English, Japanese, Spanish, and Portuguese are supported.

An „electronic forum“ provides an opportunity for the creation of partnership, and for sharing of experiences. This constitutes opportunities for creating alliances for the development of Information Society applications.

The number of GIP database entries, including national inventory links, off-shore links, NGO links and a number of R&D and other programm-based links, totals currently 3.760 entries and the number of GIP website customer hits amounts to 14.000 hits per day in February 1999. Approximately eighty-five country domains contacted the GIP servers.

The visibility of the GIP has been promoted by all partners in several international conferences. Special GIP Awareness days were organised, leading to an increase of customers. Technical support as well as public relations materials were provided. In this way, the GIP has envolved beyond its G8 boundaries and now welcomes the participation of all countries, international institutions, non-governmental organizations, initiatives of the private sector etc., having interest in developing a strategy towards the deployment of the Global Information Society and wishing to share in this experience.

The participating countries include the original G7 countries (Canada, Germany, France, Italy, Japan, United Kingdom, United States), and also the Republic of Korea, Switzerland, Egypt, Poland, as well as South Africa. Other entities include the European Commission, Global Bange-mann Challenge, AGIP (African Global Inventory Project) and PICTA (Partnership for ICT in Africa), The World Bank, and the Internet Fiesta initiative.

All partners have contributed to the success of the GIP. Its achievements and its impact are:

- The coordination of physically distributed inventories through a simple and robust data structure and a simple management structure (GIP Steering Committee),
- The integration of various independently developed databases, expanding out of the initial kernel of the few founding IS inventories,
- The provision of a multilingual interface, easily extensible to new language interfaces,
- The rapid and efficient handling of initiatives through an off-shore service,
- The potential of the software to monitor the development of the Global Information Society and to provide on-line services (catalogue, newsletter, posted requests, forum, etc).

The GIP has had a positive impact on implementing the G7 initial goal to demonstrate the potential of the Global Information Society and to promote its deployment. It is a true example of internationalization of efforts.

The Global Inventory Project has had an enormous success in attracting, through its national inventories, a lot of individual sites of various sectors, also in countries outside the G8 area. It allows to identify Information Society related activities world-wide, in many national languages. This led to a strong interest, and the number of visitors to the GIP site has enormously increased, confirming the usefulness of the Global Inventory Project, and the need for such an inventory.

3. Conclusions and Perspectives

The Global Inventory has the potential to become an important global reference point for the Global Information Society. Relevant information can be exchanged world-wide. The end of the pilot phase is now the opportunity to define its definite operational structure.

A number of proposals concerning further development of the GIP as a service have been made. For instance, the content should be increased to achieve more added value, editing should be given more attention, and the multilingual functionality should be further promoted. However, only a strong international multilateral commitment to invest in the service would lead to success.

ISAC, the Information Society Activity Centre of the European Commission, will run the main GIP server up to the end of 1999 with internal resources. The national inventories of the partners will be maintained in the same way. The G8 partners are establishing a plan for the continued service of the GIP, depending on the commitment and the willingness of the partners to its continuation. This might include a clear definition of the mission of the GIP for the future, its operational structure, and the benefits to users, like citizens, government or industry. Part of the plan will be the further extension of the GIP to countries outside the G8 environment.

In late 1999, a workshop will be arranged to review the role, the achievements and the impact of the GIP, and to pave the way for its continuation.

Further information: *<http://www.gip.int>
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Global Interoperability for Broadband Networks (GIBN)

G8 Pilot Project Theme 2

Final Report

1. Purpose and Objectives of the Pilot Project

Ministers at the G7 Conference on the Information Society in 1995 agreed on the need to promote the interconnection of national broadband networks and testbeds for research and education at the international and global levels. The GIBN project was considered by many as essential to accelerate the deployment of enabling broadband infrastructures for leading-edge global research and education, as well as economic, social and cultural development - the focus of many of the 10 other pilot project themes launched at the same time.

The fundamental objective of Global Interoperability for Broadband Networks was to improve the general level of interconnectivity and interoperability amongst existing and planned high speed networks and testbeds for research and education world-wide. This was to be accomplished by promoting the establishment of improved international broadband connections that would support flexibility of configuration and testing of protocols and applications, first among the three main geographic areas of the G7 countries: North America, Europe and Japan.

The goals for achieving this objective included:

- the identification of shortfalls so that those responsible may take appropriate actions;
- the provision of means for intercontinental testing of broadband applications while under development; and
- the active promotion of stable interconnections amongst the various advanced networks.

A GIBN Steering Committee was formed to oversee the implementation of the project. The Committee was represented by senior government officials of the G7, and subsequently G8, partners, including the European Commission. Representative of other national, regional and international organizations were often invited to participate in Steering Committee meetings and other activities that it organized. These include:

- government entities funding national broadband infrastructures for research and education, and also supporting advanced communications research;
- representatives of national advanced networks for research and education, usually non-profit entities;
- representatives of regional and international organizations concerned with the interconnection of advanced research networks and testbeds; and
- telecommunications carriers who supply broadband connectivity on a commercial or collaborative basis.

2. Accomplishments

It was clear from the beginning that the development of broadband networks and applications was confronted with a „chicken and egg“ kind of problem, between the demand of broadband services and availability of broadband international networks. The problem was tackled through two approaches.

The first task was to demonstrate the potential and stimulate the demand. Initially, there were hardly in existence transcontinental networks to support broadband applications. With the support of a number of international carriers, several trans-Atlantic and trans-Pacific submarine fibre-optic cable and satellite links were made available for fixed durations. This permitted a selected number of applications with high visibility and potential, involving two or more continents to be carried out. The durations of the application trials and demonstrations varied from several months to a year.

In total, 18 demonstrations, experiments and trials were carried out involving two or more countries across the Atlantic and Pacific oceans. They concerned a wide range of applications, including:

- a) tele-medicine in treatment of cancer, neurology and coronary heart disease, collaborative microsurgery, and cardiovascular health network;
- b) tele-education, such as trans-oceanic virtual classroom and summer school;
- c) collaborative simulation and visualisation in industrial design;
- d) remote collaboration in high-performance computational research, specifically in high energy and nuclear physics;
- e) distributed studio production in film making;
- f) remote high-definition video post-production;
- g) HDTV interoperability experiment; and
- h) collaborative development of advanced research networks and global computing infrastructure.

All of these applications were successfully carried out with a great deal gained in terms of technical and operational feasibility and in some cases economic viability of such advanced, next-generation applications and services. Several applications, e.g. the satellite-based high definition video post-production and collaborative simulation and visualisation in aircraft design, broke new grounds in terms of scope and speed.

The other major task of GIBN was to facilitate the interconnection of existing or planned national broadband research networks and testbeds in the G8 and other countries via intercontinental broadband links, with a view to creating a permanent global broadband infrastructure for research and education. As several national and regional broadband research networks and testbeds had already existed before the inception of GIBN, the challenge was to link these networks across the oceans. It was envisaged that with the establishment of a global broadband infrastructure, new and innovative application trials and experiments could be carried out in much greater number, collaboratively internationally.

The task, however, was much more complex, since in addition to practical and financial aspects of interconnection, policy issues involved in trans-oceanic interconnectivity and interoperability

of national and regional networks, such as cost-sharing of intercontinental links, transit traffic, acceptable use or user policy etc., also had to be addressed.

As a result of this work, directly or indirectly, a number of permanent or quasi-permanent operational broadband interconnections across the Atlantic and the Pacific have been established, involving non-G8 as well as G8 countries.

The problem of interconnection and transit has been tackled in different ways in Europe, North America, and the Asia Pacific. In Europe, the interconnectivity has been facilitated through shared, free-transit backbone infrastructure TEN-155, to which all the European NRN's are contributing and are connected.

In the Asia Pacific Region, several initiatives to provide interconnectivity and interoperability among the research networks and testbeds have been promoted in cooperation with a group of networks, namely AIII, APII testbeds, MAFFIN, RWCP, SINET, TRANSPAC, SingAREN, and WIDE, which formed a consortium of not-for-profit organization named Asia-Pacific Advanced Network (APAN).

In North America, a transit access point, named STAR-TAP, was established in Chicago. It was widely connected to from various national and regional networks. In addition to the high-speed networks of the U.S. (e.g. vBNS, DREN, ESNnet and NREN), other national research and educational networks connected, or soon to be connected, to STAR-TAP include those of Canada (CANet-2), Singapore (SingAREN), Taiwan (TANet), Russia (MirNET), the Asian-Pacific Advanced Network consortium (APAN), the Nordic countries (NORDUnet), the Netherlands (SURFnet), France (RENATER), and Israel. However, Germany, Italy and the UK NRN's have not yet connected to STAR-TAP, due to AUP and other problems, which are expected to be resolved in the near future.

It is expected that other transit access points will be established in other regions of the world, as well as in other parts of North America, in the future.

Policy issues such as cost-sharing and acceptable use or user policy, which are essential to full global interoperability, have also been addressed. A comparative study of Acceptable Use(r) Policies is currently underway under the leadership of Japan. However, it was found that international consensus on these issues will require more time to build than that available during the term of GIBN as a pilot project. It is expected that the resolution of such issues will be further pursued through existing international organizations.

In addition to the above, GIBN has organized a series of high profile demonstrations at major international conferences, as well as workshops. These events have contributed greatly to raising the general awareness of the potential of advanced information technologies and services.

3. Conclusions and Perspectives

The GIBN Pilot Project has accomplished its goals and objectives as set forth by the G7 Ministers at their Brussels Conference in February 1995. Working cooperatively together, the G8 partners have undertaken joint projects, trials, demonstrations, activities and other initiatives to facilitate and accelerate the development of interconnected and interoperable advanced global

information infrastructure. With the support and cooperation of the private sector and international organizations, a series of trans-Atlantic and trans-Pacific broadband applications were successfully carried out, raising the awareness of the potential of advanced information networks and services. More importantly, as a result of the GIBN efforts, directly and indirectly, a solid foundation for an interconnected and interoperable global broadband infrastructure was laid, with an increasing number of national and regional advanced research and education networks and testbeds having been connected, and promising and innovative new services being carried out.

By bringing together the key stakeholders from the G8 partners and the interested regional and international organizations, GIBN identified and built consensus on critical policy, technical, organisational and financial issues that impeded the development and rapid evolution of high speed, multi-protocol, multi-service global networks. Through broad international collaboration, GIBN enhanced knowledge base, increased awareness of the potential of advanced applications, and stimulated the development and deployment of broadband networks and services.

The accomplishments of GIBN were significant. However, all the worthwhile tasks initiated by GIBN have not been concluded. It is expected that international organizations will take up the remaining and ongoing challenges to fully achieve the goals and objectives of GIBN.

Further information: <http://homer.ic.gc.ca/G7>

Success Story

GIBN has accelerated the development of globally interconnected and interoperable high-speed and high-performance information infrastructure, thus laying the foundation for the global information society of the 21st century. Through GIBN, a series of advanced broadband applications were demonstrated or tested at a global level, thus raising the general awareness of the potential of the global information society. It has also contributed to the development and deployment of advanced technology, products, services, and networks essential to the realization of the promises of the global information society.

Transcultural Education and Training for Language Learning (Tel*Lingua)

G8 Pilot Project Theme 3

Final Report

1. Purpose and Objectives of the Pilot Project

Acting globally in the information society of the immediate future demands cooperation amongst citizens on a global scale, over different cultures and languages, to an extent not necessary in the past. Helping people with adequate and effective resources to learn better how to communicate while retaining their cultural and linguistic diversity gives the concept of a global information society real meaning to citizens, because this can concretise the vision of technology which supports the exploitation of cultural diversity and richness globally, rather than a uniform monolingual scenario which forces people to adapt to technology instead of technology adapting to people.

This unique challenge of enabling more people to learn more (and more rapidly) about other cultures and languages than ever before cannot be met successfully without the help of exactly those same technologies which create this demand. As in the past, great educational changes can only be mastered when different players cooperate: public institutions and authorities, economics and the sciences (as was necessary, for example, after Gutenberg's invention of the printing press).

Network-based intensive cross-cultural education and training is a highly promising perspective for the near future, not yet a broad area of application in everyday practice. In most developed countries, large-scale implementation will trigger new alliances between actors from the traditional education and training field and technology and service providers of all types. Facilitating and speeding up that process was the central focus of the pilot project as well as its core outcome.

This overall goal has to be brought down to concrete actions, which should strictly follow the principle of subsidiarity: the means to identify actions and developments already underway or to be carried out shortly under the responsibility of a single group of players (e.g. between publishers or within one school system or within a single language family). Only when it is evident that areas of strategic importance are not yet covered by others (or will not be in the near future) should Pilot Project Tel*Lingua try to close those gaps.

The aim of the project was to develop an international network for language education and training including the cultural dimension required to communicate adequately in another language. First and foremost, it is a human network linking experts, based on a physical network of information and expertise available on demand, represented on a virtual „global“ server, i. e. an international network of servers working directly together, offering online resources in the field, presenting experiments, products and a platform for an exchange of observations, connecting teach-

ers, trainers and users. This ambitious goal should be prepared carefully by a feasibility study, which should analyse in depth the situation given, identify important actions and key players, start a dialogue between them and form a basic consensus on strategic priorities to be addressed in the subsequent work of the project.

2. Accomplishments

Tel*Lingua was to identify some small, but strategical key actions not covered by other actors, which could help to facilitate and speed up a more coherent global development in its field. To do that successfully, some factors had been necessary:

- a certain degree of global credibility, to ensure the necessary basis for synchronising the actions of other players with the guidelines and platforms to be developed under Tel*Lingua,
- support of the initial G8 image-boost for all pilot projects by the clear commitment of a sufficient number of those responsible for education and training and language policy within G8 governments,
- convincing mechanisms with a potential for implementing certain standards and guidelines globally which will be accepted by the players.

It was possible to obtain the necessary financial and organisational support of the European Union for a basic analysis and to set up the consensus process on priorities and promising strategies. This was done in the form of a feasibility study, where the respective ministries and/or expert organisations nominated by them from Australia, Canada, the European Union, France, Germany, Greece, Italy, Portugal, Spain, Switzerland, UK and the United States contributed substantially, thus including to a substantial amount countries outside the G8 group.

This feasibility study had provided a better understanding of the difficulties to be overcome on a theoretical basis and at the time by observing network activities. On realistic grounds it successfully created a specified operational plan adapted to the G8 Transcultural Education and Training for Language Learning pilot project. A functional prototype of the „Virtual Global Server“ was set up and is operational under the common Internet address <http://www.tel-lingua.org>, consisting of interlinked servers in several G8 and non-G8 countries (most of these servers at the moment are in stand-by position). This network is ready for operational service by expanding substantially the links to materials, Web sites and discussion groups in the whole field so as to approach stepwise a global comprehensive coverage of the respective meta-server. Sophisticated, user-friendly, state-of-the-art database background structures for facilitating targeted search and navigation (data warehousing) have been developed and need to be implemented on a large scale.

In a „Consensus Conference“, held in Torino in October 1996, with approximately 200 invited delegates from 15 countries, sophisticated recommendations for global actions of strategic importance were elaborated. The contingent view of almost all delegates about priorities, policies and actions needed was remarkable.

One of the results of this Consensus Conference was a readjustment of the following plans: it was commonly agreed that a single large homogeneous and global project would be unlikely to be set up successfully. It would take by far too long to reach the consensus needed over all countries interested in a totally synchronous way. Therefore, a flexible network structure of different, sufficiently synchronised projects was blue printed based on the commonly-agreed Tel*Lingua group of actions, different clusters of countries and/or supranational bodies can join their interest in areas of overlap by operational projects under a light G8 Tel*Lingua umbrella,

which on the one hand allows quick and independent progress and on the other hand can accumulate results using the common structural basis.

To achieve this common management structure - 'Tel*Lingua global management network' - was developed consisting of national management nodes (with a minimum of an assumed five of those nodes inside as well as outside G8 states). Such a node should be regarded as sufficiently functional with a minimum permanent infrastructure of one-person staff, sufficiently powerful server network capacities and access to a budget allowing successful support to set up more than one content project a year for consortia of varying composition; afterwards to coordinate operationally those consortia and to ensure the validation of outcomes, including a sustainable operation of the technical infrastructures of the virtual servers. It was clear that these national nodes would need a small, but long-term national budget.

The global „Language Industry“, which has just begun to develop, is still fragmented in various aspects. All G8 member states and almost all other states world-wide have an interest in increasing the language capacity of their citizens. The degree of this „import demand“ varies between, for example, the large English-speaking nations like the US and the UK and smaller countries/less frequently-used languages such as Danish, Greek or Korean. Transcultural communication skills show varying degrees of importance for states compared with language skills. Differences can be seen in the field of promotion and export of one's own language. Therefore further work in this field should capitalise on the mechanism developed in Tel*Lingua: problem- and interest-oriented project groups of various composition of participating countries, acting independently but within a common framework of overall goals.

A second challenge originates from the institutions and persons covering specifically the language and transcultural learning field. With the use of direct teaching in close personal contact, the classroom creates a very locally-bound structure where the perspective of globalisation (with an obviously decreasing role for the physical location of institutions to play) creates more fear than hope. On the other hand successful network-based language and transcultural learning can only be set up with the massive involvement of those teachers and trainers still using traditional methods. This made progress of real network-based learning in that field less quickly uptaking than predicted in 1995. While it seems a quick and easy matter to change our behaviour from buying books or airline tickets at book-shops or travel agencies to the Internet, the switch in our behaviour when really learning to communicate in a new language will take more time.

Successful work in this field needs new alliances and new forms of collaboration between the different players. All actors of importance have faced very substantial internal changes over the last three years. In some countries government policy in the field of education and qualification has changed substantially with the result of major structural rearrangements. Innovation plans for the different sectors of the public educational system were discussed in many countries during this time, enabling long-term strategy definitions which are needed for decisions. Different sectors, e. g. publishers, media houses, telecom and network providers over the last years had been and are still under accelerating structural change. New fields of competition arose, actors merged nationally and globally.

Education and training in all these developments plays a rather marginal role, but had been afflicted over-proportionally by structural changes. The most obvious indicator is a rapid change in people responsible in industry, including an ongoing influx of decision makers not familiar with

the field of language learning or learning in general, needing continuous and intensive awareness-raising and information delivery. In such a framework of actors over longer periods completely occupied with internal processes and changes, longer-lasting actions are needed to inform and convince them continuously.

The solution seems to keep the Tel*Lingua structures ready for broad uptake, when interchange in interesting sectors has developed sufficiently even after the finalisation of the G8 pilot project. With this in view former participants in the project should continue to raise awareness, especially amongst new actors entering the field and draw their attention to the potential of the Tel*Lingua standby structures.

3. Conclusions and Perspectives

Measured against the overall goal of facilitating and speed up development, some reasonable effects can be identified which were triggered by Tel*Lingua. To a certain extent supported and guided in its development, a series of similar national developments took place which would not have been developed so far without the help of Tel*Lingua. These activities are not synchronous in their timeframe. However, they are able to incrementally create the critical mass for a real mainstream uptake of global actions as addressed by Tel*Lingua.

To cite some examples: the British partner BECTa successfully set up a national structure „Lingu@ NET Virtual Language Centre“ (www.becta.org.uk/linguanet/index.html), which is based on technical and structural Tel*Lingua results; the German Goethe Institute - a Tel*Lingua partner in Germany - set up a virtual language centre for German on the same basis (www.forum-deutsch.de); Cervantes in Spain set up the „Centro Virtual Cervantes“ (www.cervantes.es), influenced by the Spanish Tel*Lingua participants; in Germany a sectoral university project started at the end of 1998 utilising Tel*Lingua structures to a high extent, as well as parts of the transnational collaboration network Net.Lingu@ (www.netlingua.odl.org). Tel*Lingua partners are in close contact with those responsible for the emerging „European Schoolnet“ (www.eun.org) with a view towards basing the language parts of the European „Virtual Teacher Training College“ on Tel*Lingua results.

Tel*Lingua sees the mainstream uptake of network-based transcultural and language learning as taking a few more years until a substantial part of school language learning, industry training and leisure-time language and transcultural courses are really offered and carried out over the networks (according to Tel*Lingua findings a 5-10 % share of those forms of language learning around the year 2005 is expected). It is assumed that one to two years before they occur, these important impending changes will activate a sufficient number of national governments to prepare themselves by setting up permanent structures, suitable for acting as national nodes of the Tel*Lingua global management network already prepared. It is recommended to disseminate the results already achieved on a broader basis, so as to continue to raise awareness amongst existing and newly-entering actors.

It could be useful for one or two G8 member states to commit themselves to hosting the Tel*Lingua activities for a certain period, based on concrete national actions with the clear goal of broadening the scope when development has matured. To prepare this, in mid-1999 all national delegates for the theme Education and Training will be invited to discuss their position

and their countries commitment in an adequate electronic forum with the goal to base all further work on actual needs and interests felt by the countries participating.

Further information: *<http://www.tel-lingua.org>*

Electronic Libraries (Bibliotheca Universalis)

G8 Pilot Project Theme 4

Final Report

1. Purpose and Objectives of the Pilot Project

The main objective of Bibliotheca Universalis was to make the major works of the world's scientific and cultural heritage accessible to a vast public via multimedia technologies, hence fostering the exchange of knowledge and dialogue over national borders.

The aim was to exploit existing digitization programmes in order to build up a large distributed virtual collection of knowledge and make it available via the global communication networks, enhancing the services to the end users. In this way, it was hoped to advance international cooperation towards the establishment of a global electronic library system.

Bibliotheca Universalis should strengthen the function of libraries and improve international availability of digitized resources, including not only bibliographic record but also the information content (integrating text, graphics, still images, sound and video information).

It would promote large digitizing techniques and encourage the definition and adoption of global standards. A network architecture based on distributed digital servers and a common interface for retrieval and navigation tools would be implemented. Existing standards in the field of text, image and sound digitization and of communication protocols would be employed.

Furthermore, it should demonstrate how integrated digitization techniques can support long term preservation as well as enabling immediate access to the information digitized.

All documents would belong to the public domain.

Bibliotheca Universalis should provide a practical framework for international cooperation. While building on existing initiatives, it would address interoperability problems, so creating an open environment which could facilitate participation beyond initial G8 countries.

It should also stimulate the effective management of these cultural and knowledge resources and the development of functions for user friendly retrieval of relevant information. Thus, it will address the needs of the general public, researchers, scholars and students.

2. Accomplishments

Bibliotheca Universalis was intended to provide a framework for international cooperation in the cultural field.

In order to illustrate the concept of access to the world's cultural heritage held in libraries and belonging to the public domain, a prototype built around the theme „Africa, Culture and Civilisation“ was demonstrated at the G8 Midrand conference on the „Information Society and Development“ (1996). The objectives of the prototype were to demonstrate the feasibility of interconnecting digital libraries and to demonstrate how developing countries could benefit from the new information technologies.

The audience observed the interactivity and ease of access to virtual and distributed digitized collections held by national libraries and other cultural institutions and how this knowledge can be effectively acquired and used by the end-user. Access was given to samples of digitized texts, images and sounds on the theme of Africa.

This demo was very successful in terms of international visibility with strong expressions of interest from several international organizations. All stressed the importance of the role of libraries in the Global Information Society.

Having shown the value of access to networked digitized collections, a very detailed survey on existing digitization programmes, both at the library and the national levels was conducted in order to start preparing the operational phase of the project. In addition to descriptions of the collections and their contents, political, technological, and legal issues have been covered.

The building blocks of Bibliotheca Universalis were identified:

- „American Memory“ for the Library of Congress,
- „The Digital Library programme“ for the British Library,
- „A German Library“: 1000 books, Digital Exile Journals, Online Dissertations, Information on Legal sources for the Deutsche Bibliothek,
- National Library of Canada Digitization programme,
- „National Diet Library Electronic Library Concept“
- „Memoria Hispanica“ for the National Library of Spain,
- „Memory of the world“ project for the National Library of the Czech Republic,
- „Policy Plan 1997-2000“ for the Koninklijke Bibliotheek,
- Digital project of the Bibliothèque nationale de France and „Gallica“.

In order to facilitate exchange of information on partners digitization programmes and to increase visibility on Bibliotheca Universalis, Bibliotheca Universalis web pages were created on the GABRIEL site (the web server of national libraries in Europe, <http://www.konbib.nl/gabriel>), developed by CENL¹. Thus, each library would keep the responsibility over the information made available and GABRIEL, the existing information service developed by European national libraries, would be used as a linking device. It was nonetheless highly recommended to give access to precise information on the principles for constituting digital collections, budgets and funding, access methods, technical infrastructures, digitization techniques and standards etc.

An in-depth analysis of the digitization programmes of Bibliotheca Universalis partners made it clear that several principles already applied to the creation of digital collections: encyclopedic, thematic or historic principles. For Bibliotheca Universalis, it appeared clearly that the selection of a theme common to all partners would facilitate creation and access to a coherent digital col-

¹ Conference of European National Librarians

lection. Such Bibliotheca Universalis collection could be part of an existing digital collection or be created specifically for Bibliotheca Universalis purposes. The theme selected by the partners is „**Exchange between people**“. This theme is estimated large enough to enable a significant contribution by each partner (travel writings, explorations, immigration-emigration, scientific and technical exchanges etc.). For instance, BnF has already planned to digitize documents on travels in France and in Africa, Die Deutsche Bibliothek can give access to documents on exile literature or National Library of Portugal on explorations and discoveries and so forth.

The creation of a common digital collection for Bibliotheca Universalis is a pre-requisite before an operational phase could be launched. In parallel, further work should be done on technical aspects related to digitization standards, systems interoperability, access methods (full text or records access). It was agreed to rely on an existing structure such as the CoBRA+ working group (supported by the European Commission) which will carry on a study on technical aspects with the National Library of Canada. As each partner is already giving access to digitized collections, the creation of a central repository for identifying what is being digitized has been considered useless and time consuming. All efforts should rather concentrate on the networking of collections.

A draft formal cooperation agreement was validated in 1998 and will be signed by the national libraries involved in 1999.

The participating organizations are committed:

- to share their experiences (workshops, publications etc.) and make visible their actions on Bibliotheca Universalis Web site,
- to coordinate whole or part of their digitization policies at international level in order to develop Bibliotheca Universalis,
- to contribute actively to the creation and development of Bibliotheca Universalis by digitizing documents related to the theme selected for the first phase „Exchanges between people“. Each partner will decide to either digitize items specifically for the project or to provide parts of the digitization project already managed by its institution, based on its own funding,
- to participate in the networking of Bibliotheca Universalis digitized collections,
- to promote partnerships between public and private sectors and with international organizations (CENL, CDNL, European Commission, UNESCO, IFLA², ISO³).

This agreement is open to any national library, engaged in a digitization programme of its collections. Upon decision of the steering committee, observers and other institutions can be invited to contribute. It will be signed for an initial period of 3 years: 1999-2001.

The implementation of the terms of this agreement will be assisted by a steering committee composed of the directors of the participating organisations or their representants, with a chairman designated by the members for a 3-year period. The secretariat will be attached to the chairman.

The key areas for cooperation will be addressed by ad-hoc working groups and by existing cooperation networks. Procedures will be developed for the steering committee. External funding can be sought by participating organisations for the development of Bibliotheca Universalis.

² International Federation of Library Associations and Institutions

³ International Standard Organization

3. Conclusions and Perspectives

Bibliotheca Universalis reached its initial objective of building a platform to promote international cooperation in the field of digital libraries.

New institutions have expressed their interest and joined Bibliotheca Universalis:

- Seven founding partners of the project:
Bibliothèque nationale de France and Ministère de la Culture et de la Communication (France, pilot), National Diet Library (Japan, pilot), The Library of Congress (United States), The National Library of Canada (Canada), Discoteca di Stato (Italy), Die Deutsche Bibliothek (Germany), The British Library (UK).
- New partners:
National Library of Switzerland, Biblioteca Nacional (Portugal), Biblioteca nacional (Spain), Bibliothèque Royale Albert 1^{er} (Belgium), the National Library of the Czech Republic.
- UNESCO and the European Commission as observers.

The project began as an inter-governmental project involving ministries but from the start it was carried on by national libraries as they have the responsibility over the digitized collections.

The success of the concertation led the partners to draft an international agreement for the period 1999-2001. On the technical side, it is admitted that work should continue on standards and systems interoperability.

In addition to concertation on current digitization policies both at national and library level, Bibliotheca Universalis should constitute a critical collection of knowledge related to the theme „Exchanges between people“ (texts, images and sounds) of cultural and scientific importance.

It is clear that Bibliotheca Universalis has mobilized many key actors of the library sector and has helped pull together the global effort that is vital for the success of the information society.

It also shows that increased international concertation is necessary in the field of digital libraries. A working group should continue the work on the technical issues related to digitization standards and access methods (full text or records access) and provide recommendations to guarantee digital library interoperability.

The G8 initiative on the Information Society has helped national libraries organize themselves at international level. The Bibliotheca Universalis international cooperation will raise public awareness about the vital role of information infrastructures in the 21st century in giving access to the libraries' cultural resources while preserving cultural and linguistic diversity.

Further information: <http://www.konbib.nl/gabriel>

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Multimedia Access To World Cultural Heritage

G8 Pilot Project Theme 5

Final Report

1. Purpose and Objectives of the Pilot Project

The pilot project „Multimedia Access to World Cultural Heritage“, whose leadership has been assigned to Italy, was based on a combined experience gained by each country in the field of information exchange on cultural heritage and information products, thus operating within a long-term strategic cooperation.

The main objective of the pilot project was to encourage the development of new applications and the identification of themes in the multimedia sector, in particular considering both the fruition of the artistic heritage through the use of infrastructures of information networks and the standardisation of the access ways by multimedia products.

The key objectives of the project could be identified in the following themes:

- Interoperability among databases of the cultural heritage;
- Availability of the software products and services in telecommunications networks in view of the multimedia access to the world cultural heritage
- Intellectual property and copyright protection, information storage and security.

As to the specific aims of the G8 programme, priority has been given to the identification and enhancement of the achievements made by the initiative. The lack of adequate funds to develop new projects pursuing the programmed objectives encouraged such a choice. Therefore, especially in the preliminary stages attention was devoted to coordination and identification of those activities and projects that started being completed nationally and internationally, according to the goals of the pilot project.

This orientation brought about an immediate operating impetus involving institutions and companies responsible for such projects and allowed to encourage and further develop activities and projects on well identified aims and objectives, thus avoiding the risk of losing resources and favouring a single orientation so as to add value to the single contributions.

By doing so initiatives offering the opportunity of establishing and creating multimedia databases have been identified and fostered, the aim being a greater dissemination of information on the cultural heritage.

Particularly four operating areas have been identified and given top priority for the pilot project:

1. Presentation of the cultural heritage and dissemination of information - qualitative standards for the utilisation of the cultural heritage, standard for the cataloguing and digitalisation systems as well as for multi-language communication (dictionaries, thesauri).
2. Legal aspects relating to the correct use - intellectual and property rights, information storage and security.
3. Research and technological developments - standards for systems interoperability, multimedia technological applications, telecommunications networks, user interfaces, networked research and surfing engines.
4. Testing and application - application in the field of storage and management of the cultural heritage, including the priority based identification of data entry, applications in education and training within the cultural tourism and entertainment, requirements induced by a number of users.

2. Accomplishments

For the objectives to be achieved, the project has been in close contact both with initiatives aimed at comparing standards to ease the interoperability among networks and initiatives connected to the access and use of information and images by specific users groups.

The first group includes the following projects: Cultural Heritage Information on-line by CIMI (Consortium for the Interchange of Museum Information), Common Index of Museum Objects by TAO (Telecommunications Advancement Organisation of Japan), Aquarelle and VISEUM by EC (DG XIII). The second group includes the Museum Educational Site Licensing project in the United States and the Hypermuseum and Imprimatur projects in Europe.

During the duration of the pilot project, cooperation initiatives have been launched with international projects tailored to the creation of a multi-language heritage (International Terminology Working Group). Various multimedia products have been executed, for instance various CDs among which the Multilingual Thesaurus of Religious Objects of the Roman Catholic Church, whereas at a European level it is worth remembering that under the auspices of the European Commission a Memorandum of Understanding for the Multimedia Access to the European Cultural Heritage was concluded.

Here follows a brief description of the achieved results related to the main objectives of the project:

- Interoperability among databases of the multimedia cultural heritage

The dissemination via the Internet made possible an extensive use of Data Base Management Systems at world level, to be present in web interfaces guaranteeing the network access to information contained in the Databases. However it is insufficient to guarantee the full access to and use of information. What is needed is a definition of a set of intermediate tools, both from a semantic and multi-language level, able to provide for the search for data originally acquired in different semantic languages and structures.

It was also found out, how within American and European institutions consensus grew on some interoperability standards (Z3950, SGML), that have been successfully tested by various projects supported by Organisations and Institutions (Cultural Heritage Information Online by

CIMI, AKA by Getty Information Institute, Common Index of Museum Objects by TAO, Aquarelle by EC DG-XIII).

- Availability of software products and services in telecommunications networks for the multi-media access to world cultural heritage

From the technology and market standpoint, the pilot project followed the evolution of the offer of products and services aimed at the access and use of networked information also through the monitoring of some international projects and in line with the above mentioned MOU.

Working groups have identified the projects that remarkably face these themes in the various national and international frameworks (The Digital Archives Project in Japan, Hypermuseum in EU, Viseum in EU-CA). An attempt to coordinate the pilot project and the GIBN Project has been established to face the theme of availability of broadband transmission channels in a possible future operating stage.

- Intellectual property and protection of copyright, conservation and security of information

The working group reviewed the present rules in the participating countries showing a great variety of attitudes in relation also to the various cases concerning the use of information and images.

The most remarkable aspects of the above-mentioned issue can be summed up according to:

- the final destination of the use (Copyright, Fair Use)
- security of transmission channels (LAN, INTRANET)
- limit to the reproduction of visual information (watermarking)
- reliability of encryption technology
- possibility of performing networked transactions (Billing & Accounting).

Within the identification and enhancement of the achievements of this initiative, various national and international initiatives faced the issue from a regulatory viewpoint besides the experience of experimental use of information and images in specific users frameworks, carried out through projects such as the Museum Educational Site Licensing Project (USA).

Among those initiatives it is worth remembering: in the USA, the National Initiative for a Networked Cultural Heritage (NINCH), and in Europe the MOU Working Group 3 have recently produced final results in terms of Guidelines and Recommendations. The structure of an integrated system for the networked management of exchanges of visual information was finally faced with positive results by the IMPRIMATUR project, funded by the European Commission but extended to an International Affiliate Partnership.

The G8 initiative has therefore given new impetus to the coordination of activities with the American Association of Museums tailored to the development of the Guidelines on Copyright and Trademarks that will be freely distributed to the American museums starting from September 1999.

The results obtained by the pilot project, real and tangible, are based on two levels:

- On the one side the strong commitment of search for methodological standards (Dictionaries, ICONCLASS which included a project of translating from English into Italian) found a favourable impact in those accomplishments destined to increase the multi-language heritage (International Terminology Working Group, Multilingual Thesaurus of Religious Objects of the Roman Catholic Church);
- On the other side research and determination of technological standard projects have been launched (CIMI, Aquarelle) and transparency was given to the project through Internet sites and the possibility of on-line updating of legislative initiatives and documents (MEDICI, an EC project).

The integration of activities with the two initiatives led to the establishment of two different development stages:

- Cooperation with RTD and other EC projects in the cultural field;
- Creation of „Demo Rooms“ for the display of existing projects to test the interoperability and to equip them with information services on prototype products.

3. Conclusions and Perspectives

The assessment of the set of activities developed within the pilot project and its various and complex arrangements is basically positive.

The pilot project represents an initiative aimed at satisfying a continuously developing technological sector. Within the project great emphasis has been given to the search for flexibility to ease the cultural and technological meeting involving the participating countries so as to encourage the creation of innovative tools. Priority has to be given to a set of research initiatives for methodological standards for which the framework of the project acted as a vital catalyser. In this connection, the results achieved to enhance the multilanguage heritage appear meaningful. The Multilingual Thesaurus of Religious Objects of the Roman Catholic Church could be highlighted as a specific success. Supporting the objective with an international consensus was considered as one of the main points of the project and required a great work of coordination to share the partners' contributions in a homogeneous way. This complex activity was carried out in full compliance with the cultural features marking the various national frameworks and which have been carefully enhanced and protected.

The set of positive results of the pilot project could lay the ground for a future integration of all project components through the establishment of information poles, integrated in a broadband network structure representing both the binder and the venue for meeting and exchange information among the various international partners.

Furthermore, the establishment of integrated information poles could be the main element for the direct involvement of industry in the project and further enhance the results obtained by the project along the lines of its three main objectives:

- the interoperability among the databases of the cultural heritage,
- the availability of software products and services in the telecommunications networks for the multimedia access to the world cultural heritage,
- the intellectual property and protection of copyright, information preservation and security.

Environment and Natural Resources Management (ENRM)

G8 Pilot Project Theme 6

Final Report

1. Purpose and Objectives of the Pilot Project

The purpose of the Environment and Natural Resources Management (ENRM) pilot project was to build a virtual library of networked information resources related to the environment and natural resources management in support of global conventions related to these themes.

The objectives of the ENRM Project were to:

- increase the electronic linkage and integration of distributed databases of information relevant to the environment,
- create a Global Information Locator service definition,
- facilitate the exchange and integration of information about the Earth for use in a variety of applications,
- demonstrate the breadth of information already existing internationally and
- interconnect catalogues and directories around the world.

2. Accomplishments

Individual collectors of information related to the environment continue to collect and share new and different kinds of information. The ENRM project served as a model for virtual integration of information from a wide variety of sources and encouraged a collaborative, interoperable approach that captures the full potential of the emerging Global Information Society.

A Global Environmental Information Locator Service (GELOS) was defined and has been adopted widely, for example within the European Environment Information and Observation Network of the European Environment Agency. The European Commission's Centre for Earth Observation developed the software and maintained a prototype GELOS server. This was the first step in organising an ENRM virtual library incorporating an effective information locator service using the international standard service definition.

The ENRM project focused on target issues of global concern including support for the United Nations Framework Convention on Climate Change and the Convention on Biological Diversity. The GELOS prototype server is now populated with sufficient resources relevant to these issues to form a viable nucleus for a virtual library. Arrangements have already been made for the European Environment Agency, the US National Oceanic and Atmospheric Administration, and the Secretariat of the UN Framework Convention on Climate Change to continue GELOS operation after the completion of the ENRM Project, and there are discussions with other potential hosts.

Through a Meta Information working group, led jointly by the European Commission's Joint Research Centre and the European Environment Agency, the ENRM project investigated search standards and adopted the international standard service definition ISO 23950 (Z39.50), together with GILS and compatible profiles. It also adopted GELOS-specific usage guidelines that include a set of metadata elements to describe and locate information resources registered as GELOS records in any language. A collection policy was also developed for information on the prototype GELOS server, defining types of eligible information resources, conditions for entering metadata and information resources, and quality standards.

Through a Biological Diversity working group, led by the German Federal Agency for Nature Conservation (Bundesamt für Naturschutz), the ENRM project demonstrated networked discovery and retrieval technologies to support the information requirements under the Convention on Biological Diversity (CBD). Clearing House Mechanisms for Biological Diversity in Germany and Canada were cited as examples of this. The ENRM project also developed a list of key terms that proved useful in searching for biodiversity resources and provided important links in GELOS to the text of Agenda 21, the Internet Biodiversity Service, and some national reports required under the CBD.

Through a Climate Change working group, led by the secretariat of the United Nations Framework Convention on Climate Change (UNFCCC), the ENRM project helped to install a GELOS server in Bonn. Executive summaries of most National Communications received as required under the Convention - 63 National Communications from over 40 countries - have been posted to this server. Because establishing national climate change web sites is voluntary, in contrast to the CBD, the UNFCCC does not prescribe establishment of clearing house mechanisms. However, some developing country representatives saw dual benefits of GELOS - helping them retrieve relevant information and publicising their countries' achievements.

GELOS and the German Clearing House Mechanism for Biological Diversity were demonstrated at the ENRM exhibit during the Information Society and Development Conference at Midrand, South Africa in May 1996. A prototype of the German Environment Information Network, reflecting the ENRM approach to distributed search, was also demonstrated. GELOS was again demonstrated at the third Conference of the Parties to the Climate Change Convention at Kyoto, Japan in December 1997 and at the fourth Conference of the Parties to the Convention on Biological Diversity at Bratislava, Slovakia in May 1998.

The ENRM project had a significant and often pivotal role in establishing an essential technology for virtual libraries and in fulfilling a crucial requirement of the Global Information Society: mechanisms that help people discover information resources. The project has promoted a global information locator service based on the Internet and the ISO 23950 (Z39.50) information search standard and was a key factor in the adoption of that standard by various environmental information initiatives and countries. Among the initiatives were the Centre for International Earth Science Information Network, the Committee on Earth Observation Satellites Information Locator Service, the Inter-American Biodiversity Information Network, the OECD (Organisation for Economic Cooperation and Development), the National Biological Information Infrastructure in the United States and Global Biodiversity Information Facility. In Australia, Canada, Russia, Sweden and especially in Germany, the project had a direct influence on the rapid harmonisation of standards and broadening of public access to environmental information.

An external consultant was engaged specifically to evaluate the Biological Diversity information component of the ENRM project. The evaluation concluded that the service was very widely accepted. The information was supplied and accessed from many parts of the world.

In addition to the G8 nations, other nations, non-governmental organisations, private sector, and other parties sent representatives to the ENRM meetings. For example, 51 different representatives participated in at least one of the six Meta Information working group meetings, 29 representatives in the five Biological Diversity meetings, and 28 representatives in the Climate Change meetings. During these interactions, climate change and biological diversity scientists joined with information technologists in seeking to help users world-wide in finding and using environmental data and information. They have willingly shared their expertise in the common effort to build a virtual library.

An important side-effect of the ENRM project has been the close cooperation of the secretariats for the two global conventions through the work of the Climate Change working group and the Biological Diversity working group. Those working groups strengthened that cooperation by providing technical support, advice and assistance to both secretariats.

3. Conclusions and Perspectives

The work started under the ENRM project related to the information technology aspects of the climate change and biological diversity conventions will likely continue through the secretariats for those conventions. A separate strategy group is being planned to continue the standards work on environmental meta information in association with the United Nations Environment Program. The ENRM consensus-building on common search standards now has strong roots in many other groups and organisations throughout the Global Information Society.

In addition, an important legacy of the ENRM project will be the long-term continuation of GELOS by the European Environment Agency, the U.S. National Oceanic and Atmospheric Administration, the United Nations Framework Convention on Climate Change secretariat and other organisations. A separate steering group is being established to coordinate the operation of a network linking GELOS servers.

Success Story

The ENRM project organised three topics working groups on meta information, biological diversity and climate change to develop a „virtual library“ on environmental and natural resources information. It adopted a global information locator standard based on ISO 23950 (Z39.50) and reached consensus on a global environmental information locator service (GELOS) based on that standard using software developed by the European Commission’s Joint Research Centre. That service has been extended through the European Environment Agency, the US National Oceanic and Atmospheric Administration, the secretariat of the UN Framework Convention on Climate Change and others. An evaluation of information provided by GELOS revealed a high degree of acceptance and that it provided users with valuable information. ENRM meta information strategy will now be pursued under the UN Environment Programme.

Global Emergency Management Information Network Initiative (GEMINI)

G8 Pilot Project Theme 7

Final Report

1. Purpose and Objectives of the Pilot Project

The purpose of GEMINI was to address issues and enhance opportunities related to adapting the revolution of information and communication technologies to emergency management on a global scale to reduce losses resulting from disasters.

To encourage the development of a global emergency management information network to enhance the management of emergency response situations, risks, and knowledge, specific objectives of the project were:

- To foster and facilitate development and implementation of national information networks to exchange all types of emergency management information,
- To develop and implement a global all-hazard network to exchange information among all emergency management organizations,
- To identify and promote global standards for exchanging emergency management information, and
- To provide forums to facilitate and enhance the exchange of experience and knowledge throughout the global emergency management community.

2. Accomplishments

Success in this type of endeavor requires four things:

- Knowledge - How emergency information is produced, how to manage the processes, and how to disseminate it. Although not fully developed, conceptual papers and discussions have advanced the state-of-the-art adequately for the purposes of GEMINI.
- Technology - There was more than enough technology in developed nations to support GEMINI. Adaptation to undeveloped nations would have to have been resolved.
- Participation - A critical mass of agencies, nations and content is needed to provide a sustainable level of information exchanges among the global emergency management community. At its conclusion, GEMINI comprised 28 demonstration projects from 24 organizations in 7 countries; somewhat shy of the desired minimum, but certainly significant.
- Resources - An international initiative cannot be created from nothing. It needs funding, staffing and institutional support to succeed. In this respect, GEMINI was not able to secure adequate financial, staff or institutional support to become viable as an international initiative.

In this context, the project was able to accomplish fully or in large part the following:

...

- Perhaps the clearest indication of increased awareness of the need for and benefits of a global disaster information network is the attendance at the inaugural GDIN conference - 222 people from 35 countries. This would have been inconceivable prior to GEMINI. The role of GEMINI in increasing the level of awareness was acknowledged by GDIN;
- Adequate participation was achieved to move GEMINI forward. However, lack of credibility as a viable international initiative limited participation by some key stakeholders who could have been instrumental in advancing the initiative;
- Two workshops on managing emergency information were held. GEMINI participated in 5 conferences; and
- The level of understanding of emergency management information processes was increased by GEMINI. This was accomplished through synergistic discussions among the group, exchanges with other groups and publication of papers.

3. Conclusions and Perspectives

The one thing that helped was GEMINI's early and strong association with existing international, national and organizational emergency information management networks. These provided instant infrastructure (albeit partial, in the context of what was being proposed), established communication links to the global emergency management community and emergency management content, knowledge and experience. The opportunity to leverage and extend the extensive array of existing information projects would have quickly provided much added value on a global scale.

Three GEMINI outcomes can be categorized as successful:

- Increased awareness of the potential to use the revolution in information and computer technologies to improve emergency management around the world;
- Sponsorship of demonstration projects by 24 agencies from 7 countries;
- Establishment of a successor - the Global Disaster Information Network.

Had more resources been secured, it is likely that these could have been leveraged and that GEMINI would have achieved most or all of its objectives. Had GEMINI been seen as a creditable international initiative, additional key stakeholders would likely have participated, generating further momentum. Better messaging, a less restrictive financial climate, or stronger high-level endorsements might have accomplished this purpose. The key lesson to be extracted from the GEMINI experience is that without a firm foundation of institutional support at a senior management level, international initiatives are unlikely to succeed.

Collectively, the G8 Information Society, who conceived and sponsored GEMINI, the many agencies who sponsored demonstration projects, and the people who unstintingly gave of their precious time have made a difference. Although it will be for those who follow to claim the laurels of success, their path has been made a little smoother by GEMINI's passage. As noted by Machiavelli (1527): "*There is nothing more difficult to take in hand, more perilous to conduct, more uncertain in its success, than to take the lead in the introduction in a new order of things.*"

Looking forward, the torch has been passed to the Global Disaster Information Network. GDIN has benefited from the lessons learned by GEMINI. It has extended GEMINI concepts with re-

cent thinking in knowledge synthesis, knowledge management, and disseminating information. GDIN has good institutional support. There is every reason to believe that the time has finally come for such an undertaking to succeed.

Success Story

The GEMINI concept has been given new life in the form of a Global Disaster Information Network (GDIN), championed by US Vice-president Gore and established under the leadership of the US State Department. GDIN held a conference of international disaster experts and officials in Washington DC in July 1998. The conference was attended by 222 people from 35 countries. Lessons learned from GEMINI on what it would take for such an initiative to succeed were part of the opening presentations. Conference conclusions included statements of need, principles, and next steps. The latter included a series of discussion papers that would set the stage for decisions to be made at a subsequent GDIN Conference to be held in Mexico City in May 1999. A draft paper has been prepared that sets concepts from GEMINI in a 3-dimensional framework of producing information, managing information processes and exchanging information.

Global Healthcare Applications (GHAP)

G8 Pilot Project Theme 8

Final Report

1. Purpose and Objectives of the Pilot Project

The Global Healthcare Applications Project has sought to demonstrate the potential of telematics in the field of medicine and health care and to promote joint approaches to issues such as the setting of standards. This has been done through 10 sub-projects covering a range of applications and issues:

1. Towards a global public health information network
2. Improving prevention, early detection, diagnosis and treatment of cancer.
3. Improving prevention, diagnosis and treatment of major cardiovascular diseases.
4. International concerted action for collaboration in telemedicine.
5. Enabling mechanisms for a global healthcare network, including Internet connectivity.
6. International harmonisation of the use of data cards in healthcare.
7. Evidence and effectiveness.
8. Multilingual anatomical digital database.
9. Medical image reference centre.
10. Special Interactive TV and Multimedia Programmes for Professionals and Public in Dentistry and International Online Academy for Dentistry and Oral Medicine.

The project was steered by national coordinators, appointed by each G7 Government, under the chairmanship of the European Commission. In mid 1998 the chairmanship passed to the UK national coordinator. In March 1999 Germany took over responsibility.

The initial six sub-projects were able to secure limited financial support for feasibility studies from the European Commission to cover that part of their work relevant to the objectives of the European Community's research and technological development programme and its Information Society Project. Observers attended meetings of national coordinators from Australia, Greece, Norway, Ireland, Finland and the World Health Organisation. Reports on the project and its sub-projects were posted on the world wide web.

2. Accomplishments

A great deal has been achieved by the separate sub-projects. Details are set out in the note appended to this report. Some sub-projects have completed their work; others are still under way. Overall, the project has demonstrated that the G7 initiative and activity in this particular field of application has served as a catalyst for global international cooperation. Through the „upstream“ sub-projects on telemedicine and enabling mechanisms, international consensus meetings have been held involving key people in G7 and other developed countries. They have acted as „clearing-houses“ for information technology in health and promoted the exchange of

information on rapidly changing technology development and applications. Through the „intermediary“ and „downstream“ sub-projects, international interoperability of systems and electronic data in the health field has been promoted. They have demonstrated practical solutions to problems and highlighted issues for further consideration by relevant international organisations.

The project has not only demonstrated benefits for the introduction of meaningful and secure communication tools in healthcare; it also helped stimulate partnerships between public and private sector concerns with a view to creating markets for new products and services. For example, through the sub-projects on use of smart cards new market opportunities have been demonstrated for software and telecommunications companies. Through the sub-projects on cancer, public health information, medical imaging and dentistry, new market opportunities have been demonstrated for publishing and educational concerns. It has to be recognised, however, that different countries have different systems and traditions for the provision of primary and specialist health care, which involve differing levels of public finance and interaction between the public and private sectors. These and differing cultural and linguistic requirements will continue to challenge the development of global markets for information technology applications in the health sector.

The project has demonstrated that a number of benefits for providers and consumers of health care services are already being realised, in particular where difficulties in providing and accessing services in remote locations have been the driver for change. The technology for remote referrals and for rapid information exchange is already in place in the health field and is being used by service providers working closely with technical experts backed by companies who see growing markets and investment opportunities. The project has identified a number of obstacles to wider use and more rapid development of the relevant technologies in developed and developing countries in the health field, which include:

- the level of investment of financial resources required to establish a critical mass of users, set against the net benefits (e. g. in terms of improved quality of service) that can be expected in the short to medium term;
- the fact that the benefits and cost savings do not directly accrue to investors in health care systems;
- the small base of current „pioneer“ users and the lack of clear strategies for ensuring sufficient numbers of early adopters in order to transform the pattern of services in particular specialties or geographical areas;
- the lack of standard practice on health technology assessment and dissemination of results, without which large scale planned implementation is not possible;
- the lack of necessary infrastructure in remote areas; many parts of the world have no access at all to a telephone or have access only on a communal basis;
- the limited availability of resources to help developing countries in this field;

- difficulties in standardisation of information technologies because of the rapid rate of change in technology development, and the consequent lack of interoperability internationally;
- real concerns about security of patient data and uncertainty about the most practical and reliable methods to protect it;
- the perceived threats to existing clinical practices and the perceived new risks to which health care providers might be exposed (e. g. litigation concerning second opinions).

3. Conclusions and Perspectives

In the four years that the project has been running, there have been great changes in public perceptions of information technology and understanding of what it can do. The potential benefits for providers and consumers of health care services are:

- the further development of evidence-based medicine and health care policy-making, made possible through ready access to large-scale shared databases;
- improved diagnosis and clinical decision-making, made possible through health data card-accessed reference networks, through real time remote consultations with specialist clinicians and laboratory services and through easy access to electronic educational reference materials;
- the further development of patient-centred primary health care, made possible through electronic patient records accessed by general medical practitioners; and shared within regional health networks;
- the greater involvement of individuals in their own health care and health promotion, through access to self-help and domestic care interactive programmes;
- improvement of undergraduate and postgraduate medical education made possible through self-help educational devices and easy access to electronic educational materials.

Project coordinators in each of the G8 countries and observers from other countries, including Australia, Finland, Greece and Norway who have taken part in the Global Healthcare Applications Project agree that international collaboration in certain aspects of the field of health information technology needs to continue. Further work should continue in the health field in respect of

- medical image databases;
- distance learning for professionals and citizens;
- smart cards and secure health care information exchange (harmonisation of standards and security architectures); and
- monitoring of policies and strategies in health telematics and telemedicine (health care delivery at a distance).

A memorandum of understanding between Governments or some other means is being considered to allow interested countries to continue cooperation under the banner of the „Global Information Society“, on the basis of the same broad operating principles agreed at the G7 Ministerial conference held in February 1995.

Further information: <http://www.bmggesundheit.de>

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Global Healthcare Applications Sub-project Achievements

Towards a Global Public Health Information Network - Coordinator: Germany (*Ulrich Laaser, ulaaser@mail.uni-bielefeld.de*)

This sub-project focused on the design of a network for the exchange of data on vital statistics and communicable disease surveillance. A database-directory for all areas of public health was achieved and technologies for integrated access were developed. The World Health Organisation has indicated that it will take this initiative forward, taking account of the work of the EU's European Antimicrobial Resistance Surveillance System and of the US-EU Task Force on Communicable Diseases. The EU has also followed up the work through its IDA-EUPHIN projects on health monitoring and disease control.

Improving Prevention, Early Detection, Diagnosis and Treatment of Cancer – Coordinator: France (*Gerard Brugal, gerard.brugal@imag.fr, <http://pathconsult.imag.fr>*)

This sub-project has demonstrated that feasibility of setting up an international network of reference cancer centres, accessible through telematic networks. A pilot network of centres has been established. Standards have been agreed by major user groups. Demonstrators have been developed for remote consultation of pathologists and remote-controlled microscopy for diagnosis of frozen sections in real time during surgery, for internet use for continuing medical education, for second opinion over distance, and for planning of treatment in radiotherapy.

Improving Prevention, Diagnosis and Treatment of Major Cardiovascular Diseases - Coordinator: Italy (*Attilio Maseri, amaseri@rm.unicatt.it, <http://www.g7cardio.org>*)

This sub-project has concentrated on the development of a clinical communication system and of common standard clinical databases for improving the cost/benefit ratio by integrating patient care data and health economics analysis into a „shared stratified system of care“. Work included integration of intranet databases with health cards. The project has produced a multimedia working model demonstrator for such a system of care. The sub-project included a preventive

medicine component which has concentrated on developing international consensus on risk factors.

International Concerted Action for Collaboration in Telemedicine - Coordinator: Canada (*André Lacroix, lacroixa@ere.umontreal.ca, <http://www.g7sp4.org>*)

This sub-project has encouraged information exchange on the use of telemedicine. Links have been established to the EU Teleplans project. The International Multipoint Project of Advanced Communications in Telehealth was a limited-scale pilot project. As a key project of importance for horizontal questions, the project has organised Forum-conferences concentrating on specific issues of telemedicine today, such as standards or cost/benefit relationships. Two further forums are planned in 1999, following which conclusions will be agreed and published.

Enabling Mechanisms for a Global Health Care Network - Coordinator: UK (*Ray Rogers, r.rogers@mcmail.com, <http://www.ehto.be/sp5>*)

The sub-project has explored, through a web site and closed discussion group, barriers to achieving a global information society in the health field. It has examined in particular barriers arising from protecting personal health information, from data meanings and database navigation, from legal accountability and ownership and from access to networks and messaging standards. Its work has stimulated further consideration of these issues by, among others, the relevant technical committee of the International Standard Organisation.

Internet Connectivity – Coordinator: USA (*Elliot R. Siegel, siegel@nlm.nih.gov*)

This sub-project developed and demonstrated evaluation tools and metrics to assess the quality and performance of (end-to-end) Internet connections that are increasingly used to support healthcare. An important finding, recently published in the informatics research literature, was that the effective bandwidth of Internet pathways and networks is driven more by local congestion and bottlenecks than by international links.

Smart Cards and information exchange security in health care – Joint Coordinators: France, European Commission, Italy and Germany (*Hervé Doare, hdoare@capgemini.fr*)

This sub-project aimed to define and validate international interoperability in two domains: an international emergency data set stored in a smart card and secure exchanges in health care, using smart cards. Coherent implementation of patient data cards has been demonstrated. General agreement on security standards is expected to be reached later in 1999.

Evidence and Effectiveness - Coordinator: Canada (*Andrew Penn, andrew.penn@ualberta.ca, <http://www.medlib.com/g7/evidence>*)

This sub-project has sought to develop a register of randomised controlled trials in the field of stroke management; criteria for costs, risks and benefits of data capture for research and management; on-line access to best medical knowledge accessible to clinicians and the public and a virtual institute of evidence of effectiveness. Work is continuing on the development of a protocol for stroke management involving 24 hospitals and five countries.

Multilingual Anatomical Database - Coordinator: USA (*Michael J. Ackermann*)

This sub-project sought to produce multilingual anatomical labels which will be used to enhance the multilingual capabilities of the US National Library of Medicine's Unified Medical Language System and the future Visible Human Project database. This would enable anatomical labels to be displayed in various languages thereby aiding, for example, international telemedicine consultations.

Medical Image Reference Centre - Coordinator: Japan (*Hiroshi Chimura, hc-jzd@mhw.go.jp, <http://www.medirec.ncc.go.jp>*)

The objectives of this sub-project was to support clinical activities, contribute to medical education and training and facilitate medical research. The reference centre being developed in Japan includes clinical and pathological images (still and moving) for cancer and cardiovascular diseases (including typical, rare and difficult to diagnose cases), and access to image databases via the Internet. Work is continuing on the development of data collection mechanisms, on-line publishing, and a global organisation (including regional coordination centres). A technical group will ensure interoperability with other image databases.

Special Interactive TV and Multimedia Programmes for Professionals and Public in Dentistry and International Online Academy for Dentistry and Oral Medicine - Coordinator: Germany (*Alexander Ammann, ammann@quinline.com, <http://medlive.globaldent.com>*)

This sub-project, which started in 1998, aimed at using telematic tools to develop and support an international network for education and training in dentistry and oral medicine, with the help of a complete system of computer assisted and on-line available educational material. This material will be transferred via Digital Satellite-TV and Internet Services. Quality assurance, i. e. the development of international harmonised technical and educational standards for certified material which appears on the two platforms, was a main goal of the project. Development and certification went along with the creation of an International Online Academy for continuing education and distance learning. The project brought together institutions responsible for education in dentistry and major telecommunication providers. Work is continuing.

Government On-line (GOL)

G8 Pilot Project Theme 9

Final Report

1. Purpose and Objectives of the Pilot Project

The main purpose of the project was to create a fertile environment that enables governments, academia and other organisations to come together to exchange information that leads to global co-operation and collaboration in the further development of the Information Society and the role of government within it.

The primary objective of the project was to investigate the scope for and to promote a significant increase in the use of on-line technology to transform government so that, in the future, most administrative business can be conducted electronically.

2. Accomplishments

GOL has helped information age government policies and plans to mature at a faster rate

GOL has demonstrated that it has met its objectives as a G8 Information Society Pilot project. It has also succeeded in accomplishing a number of valuable outcomes:

1. Global cooperation and mutual trust

GOL has attracted the active participation of more than 20 countries around the world and international organisations such as COMNET-IT⁴, ICA⁵, GIIC⁶ and the OECD⁷. Opening up the project to non-G8 countries was a significant factor in achieving solid results. GOL benefited from a greatly expanded range of ICT perspectives, experiences, and interests. The project established an atmosphere of mutual trust among participants that was conducive to international cooperation.

2. Valuable results

GOL initiated a number of subprojects, collaborative studies and information exchanges on a wide range of topical ICT-related issues across different levels of government. It has delivered significant outputs including:

⁴ Commonwealth Network for IT Development

⁵ International Council for Information Technology in Government Administration

⁶ Global Information Infrastructure Commission

⁷ Organisation for Economic Cooperation and Development

- Assessments of „Democracy and government on-line services“ covering contributions from 15 leading thinkers from 10 countries. The paper focuses on the democratic process and how public authorities interact with citizens through the use of information technology.
- A report entitled „Information Sharing and Re-Use for Improved Government Services: Vision, World Trends, and Solutions“ providing an analysis of the opportunities and current status of information sharing by government departments in 11 countries.
- A portfolio of „Best practices and case studies in electronic governments“ that provides valuable insights into approaches to electronic service delivery and information age government as well as a starting point for public administrations planning to engage in similar projects.
- A collaborative study between GOL and ICA resulted in the „Government use of the Internet“ report, which compares the progress being made by governments in using the Internet for internal administrative efficiencies and service delivery to the citizen, in 16 countries. This report has been translated into several languages.
- Focused discussions and information exchange at meetings on more than 20 topics identified by GOL members as key issues for government to tackle in progressing electronic government. Material has been used to develop GOL situation reports on a range of subjects that include E- forms, Kiosks, and E-Commerce. National governments have used this material to inform their own policy developments.

3. Global coverage

The project web site (www.open.gov.uk/govoline/golintro.htm) has been used extensively to publish results to a global community. A report that provides a permanent record of all the achievements of the project has also been produced and is available on the web site. Dedicated subproject web sites, accessible via the GOL web site, have been set up to provide single points of entry to information on progress made by governments on topics such as Smart cards, the Year 2000 and Award winning IT solutions.

4. An effective and sustainable framework for information exchange

GOL has facilitated open exchange of information and experiences of the Information Society and in particular, government's role within it. Information has been disseminated rapidly by working electronically through the use of e-mail, list servers and videoconferencing. Appropriate management procedures were put in place enabling the project to run with a light touch and minimal bureaucracy. Members have been able to test new directions and be informed by approaches and successes elsewhere.

3. Conclusions and Perspectives

The GOL pilot project has been a success

The members judge the project a success and their views captured during the project evaluation are reflected in the GOL final report.

1. G7 initiative

The G7 origins of the project has been an important factor in gaining recognition, in encouraging wide participation, and in gaining domestic support for participation.

2. A flexible approach to the project tasks

The ability to adapt to new ways of working contributed to the successful outcome of the project. As the project evolved, GOL activities became more varied, project members optimised limited resources and embraced projects that were more broadly based and collaborative. Three types of sub-projects dominated: those originated and completed within GOL, collaborative activities with another organisation and activities instigated elsewhere to which GOL added value.

3. There remains a need for common IT solutions and for a forum to share information

Many members have indicated a continuing need for a GOL-like forum in which information can continue to be freely exchanged, problems discussed and possible solutions tested. The need for common ICT solutions in the development of information age government remains strong.

A future for GOL beyond the pilot phase

1. Build upon the legacy and momentum of the G8 GOL pilot

The value of the G8 initiative and the network created during the pilot phase of the project should be leveraged. GOL can now move into a new and mature phase.

2. Evolve the GOL project into a public sector collaborative initiative to address issues related to the provision of on-line government on an ongoing basis

Many project participants have clearly indicated support for a public sector forum to foster the continued active exchange of information on policies and approaches to electronic government and continued collaboration on targeted projects to support the further development of effective information age government.

3. Maintain the GOL identity and recognition factor

It is important for the new phase to maintain the project identity and recognition factor, thereby referencing the genesis in the G8 Information Society projects.

4. Targeted work

The program of work of the successor organisation must be tailored to what is achievable with the resources available and prioritised to meet members needs. It should cover both information exchange and specific projects. GOL should work on those aspects where it expects greatest impact in the development of electronic government. Issues it should address include integrated service delivery to the citizen and information management.

5. Help position the public sector as a key player and enabler in the information society

GOL has helped to position the public sector as a recognized major player in the development of the information society. The future organisation needs to capitalize on that and continue to demonstrate globally that the public sector is a key player using technology innovatively to improve services to the citizen whilst increasing efficiency and reducing administrative costs. This benefits both the taxpayer and society overall.

6. Collaborate with other formal international organisations

GOL has demonstrated the potential for effective collaboration with other key international organisations. The new organisation should build on the synergy already established between GOL and organisations like the OECD, COMNET-IT, and the ICA to add value to the work and to promote exploitation of the results.

7. Sponsor technology transfer both between members and from members to the developing countries

There are tremendous opportunities for the current GOL members to contribute their extensive experience and knowledge to ensure that the developing countries benefit from IT.

Global Marketplace for Small and Medium Enterprises (SME)

G8 Pilot Project Theme 10

Final Report

1. Purpose and Objectives of the Pilot Project

The overall objective of the G8 Pilot „Global Marketplace for SMEs“ was to facilitate increased competitiveness and participation in global electronic commerce for SMEs. This has been addressed by:

Theme 1	Global Information Network for SMEs. Theme leader was Japan.
Theme 2	SME Requirements - Legal, Institutional and Technical. Theme leader was the European Commission.
Theme 3	International Testbeds for Electronic Commerce. Theme leader was the USA.

The European Commission (also providing the secretariat), Japan and the USA jointly led the project.

While initially involving the G8 countries and the European Commission only, participation expanded rapidly. Currently the pilot has over twenty countries and several international organisations. Although participation stabilised after about two years, in the last year of the project interest was rising again, notably from developing and Central and East European countries.

2. Accomplishments

Theme 1: A large network of business information on the Web has been established, the Global Information Network for SMEs, with contributions from 15 economies and five international organisations (including the European Commission). Each participating economy or international organisation created its own home page. These provided information on products, technologies and so forth offered by SMEs of the country, on SME representative organisations and other contact points, on government policies towards SMEs and on policies benefiting SMEs trading in the country. Japan has created the general entry point (homepage) for the Network.

The theme was successful by giving an example of a Website dedicated to SMEs and electronic commerce. This has clearly motivated others to create focal points for SME information. On the other hand, the Global Information Network faced some challenges. Some of the information that was provided at the early stage by the public sector is now also available from the private sector. The borderline between public and private needs constant re-evaluation, where the outcome may be different for each country. The Network would be even more useful if a multi-lingual search could be supported, and first contacts with private sector search engines have been established to achieve that. There is also a need for a higher level of uniformity of presentation, which may be

achieved through continuing co-ordination on the Network. Finally it is costly to maintain the information base and to enrich its contents.

Theme 2: International and national working groups have been studying the policy issues in electronic commerce for SMEs (legal, technical, institutional). This has contributed to policy definition in many countries. In fact, this theme has been very successful in catalysing electronic commerce policy making, for example, the formulation of the European Initiative in Electronic Commerce in April 1997, which is the framework policy paper of the EU. Recently, representatives from several countries have acknowledged the important role of this pilot for shaping national electronic commerce policy, and obtaining practical ideas for the implementation of such policies. Work in theme 2 in Japan has led, among other things, to guidelines for certification authorities and an overview of legal issues, formulated within the private sector initiative.

A best practice book was issued in April 1997 with updates in April 1998. This provides examples how SMEs deal practically with the theme 2 issues and is a tool for awareness creation. A major conference of the project was held in Bonn/Germany in April 1997 and this was followed by another conference in Manchester in September 1998, and a final event in Texas, April 1999.

Theme 3: Thirty-three international testbeds or pilots have received the G8 label. Testbeds have been grouped into categories: background for e-commerce for SMEs, implementation of trading forums, electronic payments, infrastructure, and information resources. The USA set up a website containing the testbed descriptions in a common format and providing links to the pilot projects' websites, as well as online registration for new ones. Analyses of these projects have been performed by the USA and by the European Commission.

This theme has been hampered by a lack of resources to provide more visibility and by conceptual problems about what appropriate international testbeds for SMEs could be. The latter indicated a concrete challenge for the future: cooperation of international testbeds that show how the global marketplace for SMEs can become a reality. However, by bringing together the experiences of people involved over several years in testbeds it was possible to define a set of priorities and concrete ideas for future SMEs testbeds.

3. Conclusion and Perspectives

The pilot contributed substantially to electronic commerce policy and actions in most of the participating countries. It has also decidedly contributed to sparking off the international dialogue.

In addition, the experience has clearly shown that for such international cooperation to be effective, at least a minimal budget should be available. Actions require the presence of at least some kick-start public funding, which can then attract private funding. The Pilot was fortunate that such funding was available from individual countries, from the European Commission (which supported the secretariat, reports for theme two, the conferences, and most of the pilots), and from some others. For example the OECD supported an SME study.

Finally, the G8 label itself has been very useful. It has been a vehicle to attract new membership. It has also been a support for a number of the testbeds in their marketing.

As far as the future is concerned, there is no doubt about interest in continued work on the global marketplace for SMEs. There is no other private/public sector forum where „policy meets practice“, that is where the practical implementation of electronic commerce tools and policy effecting SMEs is its focus. The G8 project has been a catalyst for electronic commerce activities. However, the „Global Marketplace for SMEs“ is even more of challenge than ever before. Therefore future work should aim to realise this vision rather than aim to carry forward the G8 label.

A continued dialogue is needed on best practice for SMEs, preferably with fully international participation and with strong involvement of SMEs and their representative organisations should be pursued in global cooperation with the public sector.

Future work should aim at:

1. Providing information and improving awareness in training about electronic commerce aimed at SMEs, including continuation of the Global Information Network and the Global Marketplace Website.
2. Promoting international pilots for SMEs as participants in global trade and enabling SMEs to make the transition from the paper-based economy to the digital economy.
3. Strengthening international collaboration between emerging, developing and industrialised economies in electronic commerce for SMEs.

Along these lines the participants at the final meeting of the G8 Pilot in Dallas, 15-16 April 1999, recognised the benefits of focused action for SMEs in the global marketplace as a valuable and unique contribution to the international dialogue on electronic commerce. The European Commission will coordinate international efforts by interested parties to define a detailed action plan for future work in this area by Fall 1999.

Maritime Information Society (MARIS)

G8 Pilot Project Theme 11

Final Report

1. Purpose and Objectives of the Pilot Project

MARIS was a project directly related to industry and its competitiveness. MARIS was not a pilot project in the strictest sense, but rather a set of pilot application areas. MARIS was currently organised in five sub-projects covering shipbuilding, marine transportation (and in particular inter-modal transport), maritime safety, fisheries and the marine environment. A horizontal project on maritime education and training has been added in 1998. The MARIS projects were designed to create structures for cooperation between maritime players around the world. Awareness of new types of technologies and services among the potential user communities should be raised. The more technical objectives that are pursued in the MARIS projects were:

- To increase the competitiveness of maritime industries,
- To enhance logistic efficiency and support transport intermodalism,
- To improve maritime safety and
- To improve transparency in fisheries, to foster the environment-friendly use of marine resources and to encourage electronic trade in fisheries world-wide.

MARIS was coordinated by the European Commission and the Canadian Hydrographic Service on behalf of the Canadian Government. A short outline of the five sub-projects follows:

MARSOURCE was a fisheries and marine environment information network which connected various existing databases and provided the fishing community with technical, legal and economic information.

MARTRANS (recently renamed to INFOLOG/MARTRANS) aimed at the development of information technology applications (e. g. simulation of intermodal freight flows, automated transport booking and ordering, tracing and tracking of cargo and vessels and EDI-solutions for small and medium sized enterprises) to support seamless intermodal transport in the framework of efficient supply chain management.

SAFEMAR was developing solutions for safer ship control and communication, both on-board and ashore. The project supported the implementation of international directives, conventions and resolutions in the field of maritime safety.

MARVEL aimed at the development of information and communication technologies for the intelligent manufacturing of ships and other complex maritime systems. Shipyards and their suppliers were linked into world-wide engineering and procurement networks in order to improve their global competitiveness.

FEMAR aimed to stress the need for information-technology related training within the maritime sector. It intended to promote a more cohesive approach towards maritime education and training which could result in a framework for maritime training.

An important component in the MARIS approach was that it was user-driven. The project areas and the focus for the applications were defined according to needs specified by users in the maritime sectors.

2. Accomplishments

MARIS has reached a mature state - with regard to both the organisational framework and the technical contents:

- On the G8 level an organisational structure has been established with partners in all Member Countries. Carrying the G8 label has been extremely helpful to make MARIS a success. Although maritime business has been subject to „globalisation“ for a long time, the visibility of MARIS that was brought about through the G8 framework has significantly helped to gain momentum and establish a fruitful discussion on the future impact of IT in the maritime world.
- MARIS has already seen a significant enlargement beyond the G8 countries. The Mediterranean, Scandinavia and the Baltic Sea Region, Latin America and Eastern Asia have become new focus points and partnerships are evolving on various levels.
- The sub-projects have progressed very well: The MARSOURCE web-site was highly successful and is about to be extended; MARTRANS has created a number of very useful technical projects and new ones have been added only recently; SAFEMAR projects were pushing the technological edge in their field and helped to implement the latest safety standards; solutions from MARVEL offered the shipbuilding and ship-repair industry significant cost and time advantages while maintaining high product quality and production flexibility.
- On the regional level a MARIS network was formally inaugurated in May 1997. The network currently comprises four nodes with offices in Spain, Germany, Italy and Finland, but is about to be expanded to other European regions.
- Up to now 40 technical projects have officially received the MARIS label. The label was introduced to identify projects that were relevant to the building of the Maritime Information Society and could serve as reference activities. So far a total of more than 30 workshops covering the various MARIS sub-projects were held in 15 countries.

Building the maritime information society is an on-going task. The first building blocks have been put together and the first success stories are being written. The maritime world is not homogeneous and it comes as no surprise that some sectors are moving faster than others do:

- Where technical demands and strong international competition have forced an early adaptation of advanced information technologies (e. g. in shipbuilding or in intermodal transport) MARIS built on existing solutions and therefore focused mainly on interconnectivity and the dissemination of results to players not yet involved.
- In other sectors such as fisheries, market and to some extent, behavioural aspects were dominant over technology aspects. Although some solutions are already commercially available, information technologies were not embraced on a sufficient scale. Here education and training as well as stable and inexpensive infrastructures supporting electronic commerce are crucial.
- To improve maritime safety adequate regulatory frameworks on global level were needed to establish the developed solutions in the field since they foremost served public interests and did not necessarily add economic value in the short term. However, the resulting equipment markets could (and sometimes already do) provide new business opportunities on a significant scale.

3. Conclusions and Perspectives

It is obvious that MARIS-related activities will continue beyond 1999, because the maritime sector increasingly embraces advanced IT solutions. New technical projects are under preparation world-wide and more will surely be created in the near future. The European Commission therefore intends to continue with MARIS-related dissemination and awareness activities, focussing on selected applications in various maritime sectors and putting special emphasis on regional maritime players and the involvement of SMEs. This framework would be open to international co-operation.

The G8 umbrella has proved to be extremely valuable: it identified MARIS as a significant strategic initiative of the major industrial nations and thus attracted the interest of a wide range of players from all over the world.

In the future more attention needs to be given to the implementation of the Information Society on the regional level and in smaller enterprises. MARIS actively tried to achieve this through focused workshops and seminars and the creation of a regional network.

To some extent, varying from MARIS sub-project to sub-project, R&D related questions have lost importance and gave way to issues relating to the necessary organisational and behavioural changes. For the future MARIS would therefore welcome to participate in a dynamic global approach towards standards and industrial implementation strategies („Best Practice“).

Further information: <http://www.maris.int/>

Success Story

BAFEGIS – Baltic Ferry Guidance and Information System

The guidance and information system for RO-RO passenger ships operating on particular ferry routes in the Baltic Sea provided continuous information and advice on navigational hazards such as drifting and extinguished light-buoys, obstacles to navigation, malfunctions in radio-navigation systems, imminent storms and severe weather conditions, adverse ice conditions etc.. Ship masters were advised throughout the passage and could thus take appropriate measures for the protection of passengers, crew, vessel, and the marine environment.

The main elements of BAFEGIS were a fax-based, route-specific information service, an electronic chart display and information system (ECDIS) and an automated ship identification system (AIS). ECDIS provided all relevant hydrographic data and contained alarm and warning functions covering the area in which the ferry operates. Updates to the electronic charts were performed automatically and could even take place en route. AIS provided for the automated exchange of ship- and cargo specific data between ships and maritime authorities, allowing improved navigation and collision avoidance and a more efficient traffic management. Two ferries have been equipped with the BAFEGIS components and the results so far were very encouraging. It was successfully proven that guidance and information systems did help to increase maritime safety. At the same time the overall transport efficiency could be improved, leading also to economical advantages for the shipping companies involved.