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Table of Contents

1. EXECUTIVE SUMMARY	6
2. INTRODUCTION	7
2.1. Project Objectives	7
2.1.1. Overall Objectives.....	7
2.1.2. Technological Objectives.....	7
2.1.3. Fundamental Requirements	8
2.2. Project Consortium	8
3. DESCRIPTION OF WORK.....	11
3.1. Requirements Analysis	11
3.2. Data Management	11
3.3. Data Broker Interfacing and Communications.....	11
3.4. E-commerce Integration.....	12
3.5. Data Broker Prototyping.....	12
3.6. Data Broker Applications Prototyping	12
3.7. Performance Assessment and Exploitation Evaluation.....	12
3.8. Dissemination and Use	13
4. CONCEPT DESIGN AND TECHNOLOGY	15
4.1. Technologies Employed.....	16
5. FUNCTIONALITY	18
5.1. Data Providers	18
5.2. Key Data Provider Features	19
5.3. Data Consumers	21
5.4. Key Data Consumer Features	22
6. SUMMARY	25
6.1. Project Status.....	25
6.2. Commercial Exploitation	25
6.3. Conclusions.....	25
7. CONTACT DETAILS	27

1. EXECUTIVE SUMMARY

Over the past decade numerous national, European and international programmes have focused on the generation of data on the natural environment. Very little of this wealth of data is actually utilised by the ultimate end user who provide services to the citizen e.g. in support of maritime emergencies (marine pollution, search and rescue, etc.).

The MERMAID project (Marine Environmental Response data Management and Acquisition using Internet Data brokerage), was a 30-month project with six international partners and a budget of over €2.15 million. The project was partly funded (50%) by the European Union under the Framework V Information Society Technologies (IST) Programme.

The central objective of the project was therefore to provide a seamless, minimum intervention link (data broker) to allow end users to rapidly access and use large distributed environmental datasets. Through the development of an Internet-based data broker capable of cataloguing, storing/referencing and accessing these datasets, the user will be able to search for, choose, purchase and download data subsets for their specific and immediate data requirements. Using the latest Internet and database tools and complying with international data standards, the data broker technology was designed as an 'open to all' service for data providers and users. The marine emergency application domain was chosen to demonstrate the technology due to its demanding requirements for timely data. However, the technology is widely applicable and the broker could facilitate a very wide range of applications requiring marine environmental data.

The project was officially completed at the end of July 2002, after the final system prototype was successfully demonstrated to the EU review panel in Brussels on 23rd July 2002. All the objectives of the project were successfully achieved, and the project deliverables were all accepted by the EU. Now that the system prototype has been developed and demonstrated, the project has effectively moved into the next stage, which is looking for ways in which to commercially exploit the system.

2. INTRODUCTION

This document describes the EU Framework V project entitled 'MERMAID'; summarising the developments and technical achievements made during the project, and outlining the final status of the project. The project (Marine Environmental Response data Management and Acquisition using Internet Data brokerage - MERMAID), was a 30-month project with six international partners and a budget of over €2.15 million. The project was partly funded (50%) by the European Union under the Framework V Information Society Technologies (IST) Programme.

The key objective of MERMAID was to develop an Internet-based data broker capable of cataloguing, storing/referencing and accessing environmental datasets. The aim was that the user would be able to search for, choose, purchase and download data subsets for their specific and immediate data requirements. The Data Broker technology was designed as an 'open to all' service for data providers and users and was specifically developed to be applied to the marine emergency response application domain.

2.1. Project Objectives

2.1.1. Overall Objectives

The overall project objective was the development of a seamless, minimum intervention link (Data Broker) to allow end users working in the marine environmental emergency application domain to access and use large distributed datasets of environmental parameters. This would entail the development of a virtual shopping centre for environmental data providers and users. This 'one-stop-shop' was aimed at providing near real-time user access to major international datasets with inherent support at user sites for sophisticated end user applications, and simple web browser-based data reader/viewer applications.

2.1.2. Technological Objectives

The key technological objectives were the development of a metadata structure for describing environmental data, and techniques for the transmission and exchange of these data based on existing standards or protocols. In addition, the development of web-enabled methods (incorporating e-commerce facilities) to search, extract, compress and transmit the variety of data types routinely encountered was required.

In summary therefore, the principle aims were to develop a system that would include the following:

- dataset search facilities;
- subset extraction;
- e-commerce facilities;
- interfacing to 3rd party, external applications;
- automatic data transfer facilities; and
- central warehousing and distributed remote data repositories.

2.1.3. Fundamental Requirements

Data Providers of the type of environmental data expected, such as the UK Met Office, typically generate large multi-dimensional datasets of many parameters, which cover extensive areas, from which most users only require a small selection of data.

In order to facilitate the typical user's data requirements, one of the key features of the system was therefore to enable the automatic extraction of 'subsets' of data from these much larger 'raw' datasets.

In addition, it was also known that data providers operate with different computing systems, using different operating systems running on different platforms. The MERMAID project therefore also had to be 'platform-independent' in order to allow access to all potential users of the system.

Another fundamental requirement was the need for an e-commerce facility, to enable the on-line electronic payment for datasets. Once purchased, the broker would then be able to activate the automatic transfer of these data from the provider to the user, without any further delay. This e-commerce facility was a unique feature of the MERMAID project.

Finally, the system needed to be able to interface directly with 3rd party applications, in order to meet the requirement of a minimum-intervention link. Users of emergency response applications should not need to exit the application at the point of 'data requirement', in order to access the MERMAID Data Broker.

2.2. Project Consortium

The project consortium consisted of the following 6 partners:

British Maritime Technology (BMT) is an international contract research and technology organisation, with wide R&D interests within the international maritime sector, the defence industry, manufacturing and the process industry.

BMT Marine Information Systems Limited (BMTMIS), a subsidiary of BMT based in Southampton, UK, was one of the two lead technical partners, and were project co-ordinators of the MERMAID project, providing administrative project management and technical direction. BMT provided key input to the design and development of the Data Broker. The development of the two emergency-response application prototypes (SARIS and OSIS) were based on BMT's established marine information systems framework, which are already used operationally by two of the consortium partners, as well as by many other international organisations.

TXT e-Solutions (TXT) is a private, IT and system integration company, with its headquarters in Milano, Italy. TXT is a technology intensive company, offering to its customer's complete solutions, based upon kernel products,

high-level competence on enabling innovative IT and specific know-how in a number of application domains.

TXT were the other lead technical partners, and played a central role in the technology and architectural development under MERMAID, bringing their specific expertise in Web-enabled applications, distributed architectures and business-to-business e-commerce to the project.

The Met Office (MO) is the National Meteorological Service for the United Kingdom, providing quality meteorological and related services for the Government, armed forces, the public, aviation and commercial customers.

MO therefore contributed to both the technical development and user evaluation of the Data Broker. As one of Europe's primary providers of meteorological and oceanographic data, the MO were well equipped to advise on various aspects of the Data Broker design, and in particular were responsible for the design of the MERMAID metadata structure. As a major supplier of data, their input to e-commerce considerations was also key to ensuring practical implementation. The MO therefore actively involved in both the requirements analysis and the assessment of the performance of the Data Broker from a data provider's perspective, and collated the data provider's assessments of the system.

The Instytut Meteorologii i Gospodarki Wodnej – Oddział Morski w Gdyni (IMGW-OM) (the Maritime Branch of the Polish Institute of Meteorology and Water Management) was founded in Gdynia 1921. It is one of five branches of the IMGW exclusively dealing with marine aspects of meteorology and conducting oceanographic services as a statutory task.

IMGW-OM was therefore both a technical, and a user partner. They were involved in the specification of user requirements with particular emphasis on data provider requirements. IMGW-OM was also jointly responsible for the development of the MERMAID Data Viewer application prototype (together with BMT Marine Consultants, based in Gdansk). They had significant input to the assessment of the application prototypes and the evaluation of the practical implementation of the Data Broker and its exploitation potential.

The Centre de Documentation, de Recherche et d'Expérimentation sur les pollutions accidentelles des eaux (CEDRE) is the technical expert and trainer of the French authorities in the field of accidental marine pollution. It is also a reputed provider of similar services to the national and international industry and to the International public community.

CEDRE are a primary environmental data user and provider, and their strong position as leading EU emergency counter-pollution specialists made them ideally suited to their role. They already run state-of-the-art information systems, including BMT MIS's Oil Spill Information System (OSIS) that were ideally suited to integration with the proposed Data Broker. CEDRE were therefore closely involved in the specification of user requirements for the



system. They also acted as a user test site during the evaluation phase, and collated the data user's assessments of the system.

The Kustwachtcentrum Nederlands (Netherlands Coastguard - NC) was formed in 1987 and was the result of a covenant between six Ministries who were all involved with the North Sea. The Netherlands Coastguard has one operational centre (Coastguard Centre) in Den Helder, which is manned around the clock. The Coastguard Centre falls under the operational command of the Royal Netherlands Navy. The Coastguard has thirteen different tasks including i.e. Maritime Law Enforcement, Pollution Control and Maritime and Aeronautical SAR (Search and Rescue) within the Dutch Exclusive Economic Zone (EEZ). These tasks are coordinated from the Coastguard Centre in Den Helder which also is the Joint Rescue Coordination Centre (JRCC) for the Netherlands Search and Rescue Region (SRR). The Coastguard Centre maintains an advanced computer information system incorporating search and rescue information simulation and planning systems, including BMT MIS's award-winning Search and Rescue Information System (SARIS).

The Coastguard Centre was a primary user partner in the project, bringing a wealth of practical experience in running maritime emergency operations. They were involved in the initial requirements analysis, advising on the practical implementation of the Data Broker and its integration within existing operational management systems. They acted as a user site during the system assessment and evaluation where the Data Broker was applied specifically to search and rescue scenarios.

3. DESCRIPTION OF WORK

The project was based on six core technical work packages together with an overall Project Management activity, a final Performance Assessment phase, and a Dissemination and Use work package. The technical development closely followed existing European and international standards for data formats and metadata structures, and made extensive use of current state of the art technologies, including SOAP, COM, ActiveX, ASP.net, SQL Server, and JAVA. The core technical work packages were;

3.1. Requirements Analysis

This phase of the project, which lasted for the first six months from January to June 2000, included the assessment of end user and data provider's needs and the Human-Computer-Interface (HCI) design criteria. This consisted of an extensive questionnaire survey, which involved more than 120 external international organisations, and also a two-day user workshop, attended by more than 10 external representatives, as well as all the project consortium members. The feedback from the survey and the workshop were synthesised into the document 'MERMAID User Requirements Specifications' (EU Deliverable D1).

3.2. Data Management

This work package, which ran from July 2000 to March 2001 led to development of the High-Level Design (HLD) and the system architecture. In particular, this work package focussed on the design of the MERMAID Data Access Engine (DAE), the central MERMAID Data Warehouse, and the fundamental metadata structure and supporting Products Catalogue. The HLD is detailed in the document 'MERMAID System High Level Design (EU Deliverable D2) and the Warehouse Database is detailed in the EU Deliverable D2.1. In addition, six generic data structures were designed that would support the high speed search, data abstraction and packaging utilities required for subset extraction. These are detailed in the document 'MERMAID Supported Data Structures (EU Deliverable D2.2). Finally the MERMAID metadata structure was based on the existing EDMED format (as used in the EU project 'SEASEARCH'), but this was expanded and modified to meet the more rigorous MERMAID requirements. The metadata and supporting Products Catalogue are detailed in the 'Product Catalogue Database Design' documentation and the 'MERMAID Metadata Specification' (EU Deliverables D3 and D3.1). The MERMAID system adopted standard compression and packaging routines which are documented in the EU Deliverable D4.

3.3. Data Broker Interfacing and Communications

This work package ran from January 2001 to August 2001, and involved the design and development of suitable protocols for communications and messaging together with the Broker InterFace (IF) component. This IF component incorporated all the functionality protocols, and was packaged for integration with existing user systems or as a construction module for new

user applications. The 'MERMAID Broker Interface component; Data Protocols Design' document details the work from this phase (EU Deliverables D5 and D6). The protocols and the IF component were subsequently demonstrated through use by the Broker and the application prototypes developed by BMTMIS and IMGW-OM.

3.4. E-commerce Integration

This work package ran from August 2000 to May 2001, and consisted of the development of the e-commerce engine, customised for environmental data brokerage. Microsoft's Commerce Server was customised for this purpose. This included the facility for providers to configure complex and flexible pricing discount policies based on consumer, on data usage or on subset size. This is detailed in the 'E-Commerce Integration' document (EU deliverable D7).

3.5. Data Broker Prototyping

This was the key development work package for the project, and ran from March 2001 to February 2002. This led to the development of the Data Broker Prototype itself, and consisted of the integration of the core Data Broker components; the Data Broker Gateway, the System Engines (Data Access Engine, Remote Data Access Engine, E-commerce Engine, Search Engine and Catalogue Engine), and the System Databases (Data Warehouse, Products Catalogue, and Pricing Catalogue). It also included the development of the Graphical User Interface (GUI). The Data Broker Prototyping Design (EU Deliverable D8) documents this work.

The work package was completed by the deployment of the prototype as a web site in a live environment ready for testing and evaluation in April 2002.

3.6. Data Broker Applications Prototyping

This last technical work package ran from April 2001 to March 2002, and culminated in the development of three Data Broker-integrated applications, which utilised the IF component to interface directly with the Broker, without the need for a web Browser. Two of these applications were modified versions of existing marine emergency response information systems (BMT MIS's OSIS and SARIS), which were then able to interface directly with the Data Broker to retrieve and import the required hydrodynamics, which then drive the models. The third application (Mermaid Viewer) again interfaced directly with the Broker to allow the viewing and manipulation of the retrieved dataset. The Mermaid Viewer also allowed integration with 'Surfer', a third party application from Golden Software. These applications are documented in the EU Deliverables D9.1 and D9.2

3.7. Performance Assessment and Exploitation Evaluation

This final work package focussed on the assessment and evaluation of the prototype system at independent test sites in four different countries by the testing partners of the consortium. Testing followed structured evaluation test

plans, and a live issue-logging web-site allowed continuous feedback to the rest of the consortium. Following this feedback, the technical partners, BMTMIS and TXT, were able to resolve any faults discovered, and implement general improvements to the system throughout the testing phase.

The test results from each partner were compiled in the Data Providers and Consumers Performance and Evaluation Assessments (EU Deliverables D10.1 and 10.2). A MERMAID Prototype User Manual was also provided (EU Deliverable 10.3). Finally, the Exploitation Potential Assessment (EU Deliverable D11) summarises the opinions of each of the consortium partners with regard to commercial exploitation following the testing period.

3.8. Dissemination and Use

This work package ran throughout the duration of the project. Three external workshops which promoted the project were organised during the project's lifecycle (in the UK, France and Poland), and a fourth is planned for late 2002. The project was represented at fourteen various international conferences or symposiums, including the following (amongst others);

- Oceanology 2000 and 2002 (Brighton and London - UK)
- SeaTech Week 2000 (Brest - France),
- World Meteorological Organisation CBS 2000 Conference (Geneva - Switzerland)
- The International Oil Spill Conference 2001 (Florida - USA)
- The 5th Eurolat IS meeting (Quito - Ecuador)
- The 6th International Conference on the Marine Safety and Protection of the Marine Environment (Gdansk - Poland).

In addition, several articles, papers and press releases about the project were published, including:

- Feature Article in BMT MIS February 2000 Newsletter
- Press Release in the Marine Engineers Review (May 2000)
- Paper titled 'The accessibility of coastal environmental information through the Internet (MERMAID – the Internet data broker concept). Published Oceanological Studies, 2, 2001, University of Gdansk
- Paper titled "MERMAID: Marine Environmental Response data Management and Acquisition using Internet Data brokerage" presented at 15th International Symposium Informatics for Environmental Protection: "Sustainability in the Information Society", Zurich, Switzerland, October 2001
- Paper titled: "The support of the marine emergency actions by the Internet Data Broker System". Presented at the 6th International Conference on the Marine Safety and Protection of the Marine Environment, Kolobrzeg, Poland.

The work package culminated in the production of the Technical Implementation Plan (TIP - EU Deliverable D12.2) and the Exploitation and



Business Plan (EBP - EU Deliverable D12.3). The TIP documents detailed outstanding technical issues that would require resolving before the system could be considered ready to be launched in a commercial environment. The EBP details the marketing strategy and business development plans, together with a 5-year financial forecast for the potential 'MERMAID' commercial system.

4. CONCEPT DESIGN AND TECHNOLOGY

The technological concept of the MERMAID system is theoretically simple. The system can be thought of as consisting of three principle components:

- Mermaid Data Broker
- Remote Data Providers
- Distributed Users (or Data Consumers)

These three principle components are further divided into sub-components, as follows:

MERMAID Data Broker

- Broker Gateway
- Engines
 - Data Access Engine (DAE)
 - Catalogue Engine
 - E-Commerce Engine
- Databases
 - Data Warehouse } combined
 - Products Catalogue }
 - E-commerce (Pricing) Catalogue

Remote Data Providers

- Remote Data Access Engine (RDAE)
- Remote Data Warehouse

Distributed Users

- Human users - who access MERMAID via a web browser
- Application users – which access MERMAID via the Application Interface (IF) component

The relationship and communications between these components is shown in Figure 1:

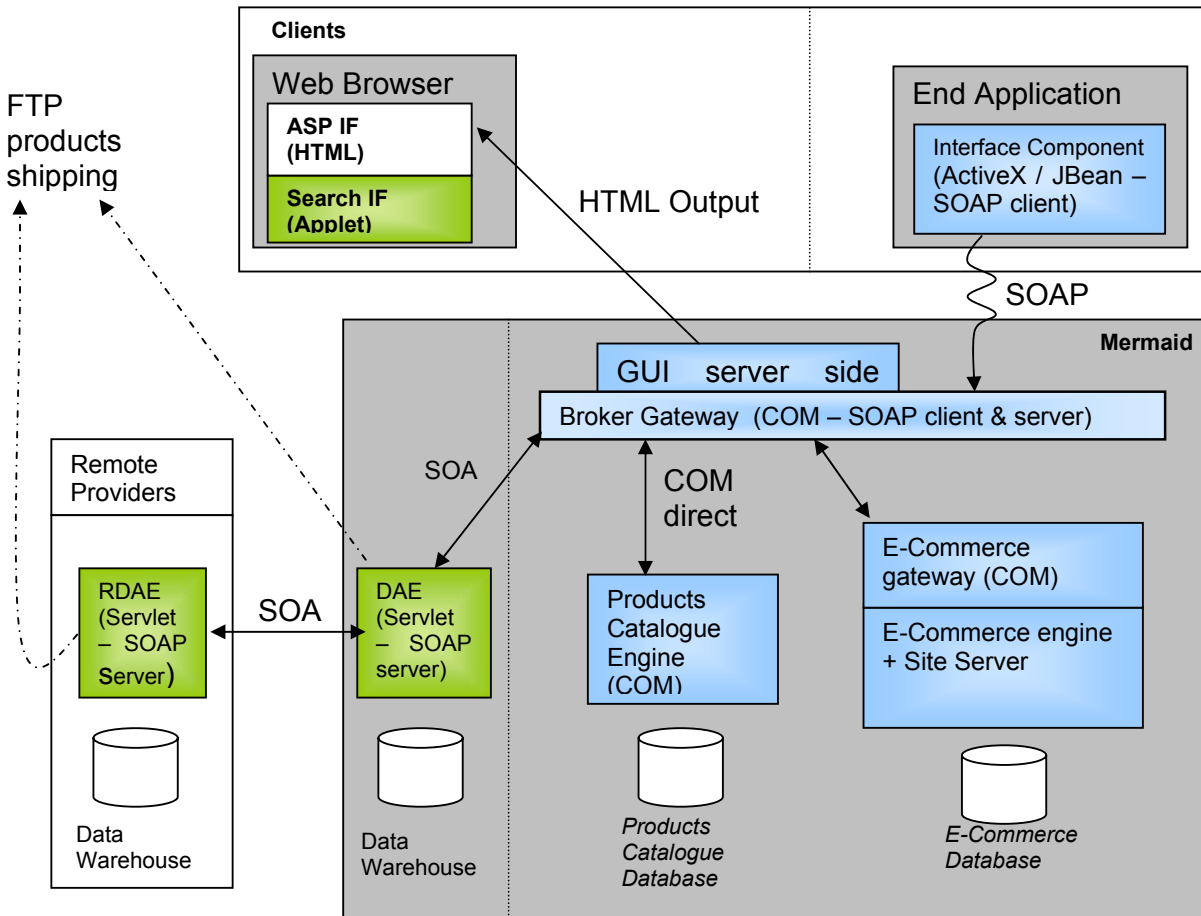


Figure 1. Schematic of the MERMAID System Architecture

4.1. Technologies Employed

The MERMAID components were developed using industry standards, principally core Microsoft (MS) technologies. MS Site Server provided the foundation for the system itself. The e-commerce facility was customised using MS Commerce Server. SQL Server was used for the development of the databases. The engines were developed using Visual Basic, other than the DAE (and the associated RDAE), which were developed using JAVA. This language was chosen due to the need for platform-independence of the RDAE. The RDAE would potentially need to be installed on different platforms, and therefore was not developed using MS-dependent technologies, which would have excluded non-MS based providers (i.e. those using UNIX or LINUX operating systems).

The web pages of the GUI were developed using ASP and ASP.net, and the Interface component was developed using Visual Basic, allowing COM integration to 3rd Party Applications.

The communications between the deployed Internet services within the Broker use the Simple Object Access Protocol (SOAP). Dataset transfers



from the Provider to the MERMAID Warehouse are achieved by HTTP upload. Transfers direct from the Provider to the Consumer use the standard File Transfer Protocol (FTP), or e-mail, and transfers from the MERMAID Warehouse to the Consumer can be achieved by either FTP, HTTP or e-mail.

If the Providers wish to store their datasets on their local server, they need to install the MERMAID Remote Data Access Engine (RDAE), as the data will be 'remote' to the Broker. This service provides the same services as the DAE on the Broker itself (i.e. dataset searching, extraction, packaging and transfer). In addition to this, the Provider also needs to install the following ancillary software, which is also used by the RDAE:

- Windows 2000 Advanced Server
- Jakarta Tomcat 3.2.2
- JDK 1.3.1
- Apache SOAP 2.2

5. FUNCTIONALITY

The functionality of the MERMAID system can be considered from two points of view; as a Data Provider and as Data Consumer. There is also the Administration of the system by the project consortium, which is transparent to the end users.

5.1. Data Providers

All MERMAID functions from the Providers point of view are accessed through the website. The core provider functions are as follows:

- Registration on the system
- Default Pricing and Discount Policies
- Dataset Registration - including description, preview image upload, costs and Shipping and Supply Mechanisms
- File Upload
- Remote Data Access
- Administration

A new provider must first register with the system, and their details are then added to the MERMAID System. Once registered, a provider can begin to register the datasets they wish to distribute through the system. This is done using the metadata facility, which allows the provider to fully describe the dataset in terms of dataset details, (geographical location, timeframes, data themes, parameters etc.), recording instruments, quality assurance information, resolution, accuracy and so on. A preview image can be uploaded to the catalogue if required, and then the costs can be entered. These will include the unit price of the dataset, any discounts the provider wants to set, and the shipping and supply mechanisms and costs. Finally, the provider decides whether to upload the dataset itself to the MERMAID warehouse (for which they must pay a fee for use of the disk space) or to store the dataset on their own data warehouse (remote to the MERMAID system). If this is the case, they are required to download and install the free RDAE software. To run this they will also require some ancillary software (Windows 2000 Advanced Server, Jakarta Tomcat 3.2.2, JDK 1.3.1 and Apache SOAP 2.2).

Figures 2 to 4 show examples of some of the Providers pages (Home Page, Registered Dataset Page, and the Metadata Registration page).

Once registered, the provider can edit any of the dataset details, or remove it from the system at any time through the MERMAID website. Providers can also interrogate the system for administrative purposes, and can acquire details such as sales per month, sales per customer, or sales per dataset, for marketing and accounting purposes.

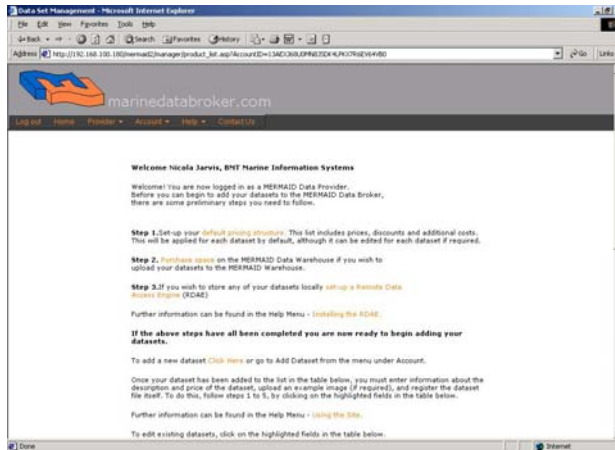


Figure 2. Example of the Data Providers Home Page

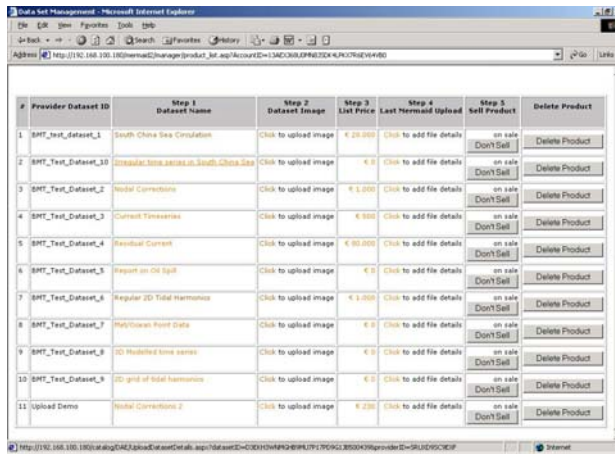


Figure 3. Example of the Data Providers Registered Datasets Page

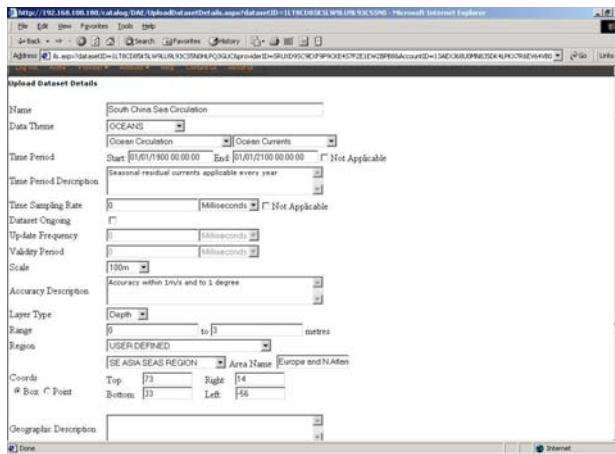


Figure 4. Example of the Data Providers Metadata Registration Page

5.2. Key Data Provider Features

The key features for a Data Provider are as follows:

- Providers can freely register with the system.
- Providers can register any number of different data sets or data streams.
- Data files can be of any format.
- Data sets or data streams can be uploaded to a central warehouse, or can be stored locally on the data provider's site for remote access.
- Providers can fully describe the details of their datasets through the metadata structure, and this can be edited at any time.
- Example images in standard graphics formats can be supplied with the data set descriptions for preview by the consumers.
- Providers can fully customise their default pricing policy, including configuring various discount facilities for subsets, named organisations, or types of organisations.
- Providers can set and edit individual pricing structures (including discounts) for each data set if required.
- Data files can be supplied on a variety of mediums which are selected by the Providers.
- Data files can be transferred through a number of mechanisms, including directly by e-mail, http, or ftp transfer.
- Providers can add or remove data sets from their catalogue at any time.
- Providers have access to customer management and administrative information at any time.

5.3. Data Consumers

All MERMAID functions from the Consumers point of view are accessed through the website, via a web browser. However, the core functions can also be accessed directly from a compatible 3rd party application (such as the example applications OSIS and SARIS) via the MERMAID Interface component. In this case, the user does not need to exit the application to use a web browser, as the application itself provides the communication path. However, the core consumer functions are principally the same in either case, as follows:

- Registration on the system (through the web browser only).
- Search Interface – to enter the details of the data required (i.e. location, data theme, timeframe).
- Dataset Interrogation – view metadata details, including the price, of the selected dataset(s).
- Shopping Basket – to allow the user to purchase more than one dataset simultaneously.
- Purchase Facility.
- Dataset Transfer.
- Administration.

A new consumer must first register with the system, and their details are then added to the MERMAID System. This must be done via a web browser, as the Application Interface cannot be used until the user is registered. Once registered, a consumer can begin to 'browse' the broker, to search for the datasets they require. This is done using the search interface, which allows the consumer to select the geographic area of interest (by either drawing on a map, selecting from a list of named regions, or entering co-ordinates). The user can then select the required data from drop down pick-lists, and enter the start and end time of interest. Finally, the user can select a particular depth or altitude layer for 3D searches. The user then has various search options, and can customise the search criteria using AND/OR search options (i.e. they can search just on location, location AND theme, location AND theme OR time, etc.). The search results are then presented to the user as a list of dataset names, together with the data provider's name, and price. The user can interrogate each resulting dataset to view the metadata as entered by the provider, including the preview image, if supplied. The user can add (or remove) as many different datasets to their basket, and when ready can purchase all the selected datasets in one credit-card transaction. The consumer finally chooses which transfer mechanism they prefer from the options supplied by the provider, and the transfer is initiated. If the user wishes to receive datasets by FTP, then they must first establish an FTP server to receive the files, as the MERMAID Data Broker acts as an FTP client.

As with the providers, the consumers have access to administrative tools which allow them to view their previous orders, and even to download the dataset again, should the need arise, without beginning the whole transaction from the start.

Figures 5 and 6 show some examples of the Consumers Pages (Home Page, and Search Results Page).

The Applications Interface allows 3rd party applications to interface directly with the system. The search criteria, such as location or theme can be automatically requested by the application, and the selected datasets transferred directly by the broker to the application for immediate use.

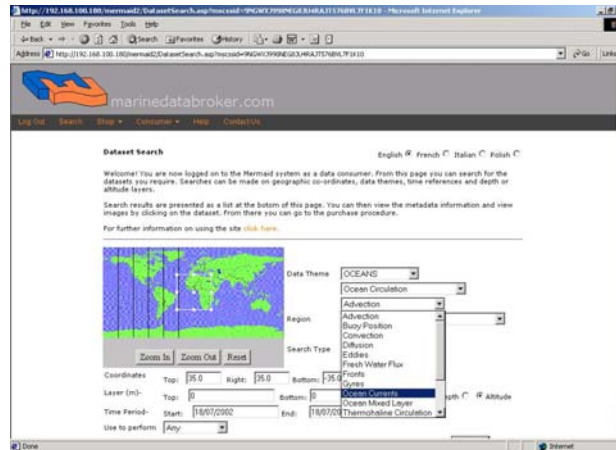


Figure 5. Example of the Data Consumers Search (Home) Page

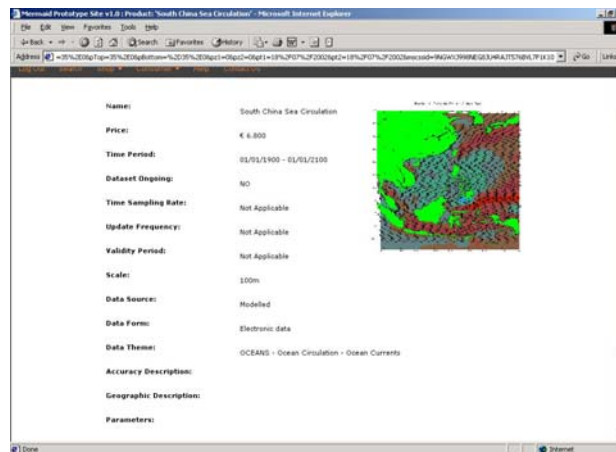


Figure 6. Example of the Data Consumers Search Results Page

5.4. Key Data Consumer Features

The key features for the data consumer are as follows:

- Consumers can freely register with the system.
- Consumers can edit their details at any point.
- Consumers can browse the Broker catalogue for specific datasets.
- Searches can be conducted using different combinations of the following search criteria;
 - by Geographic extents
 - by Time Period (Start and End Times)
 - by Data Theme
 - by 3D Depth or Layer.
- Consumers can select their region of interest by either of the following methods;
 - graphically through the use of a mapping interface
 - by choosing a named region from predefined lists
 - by manually entering the limiting co-ordinates.
- Consumers are presented with a concise list with key information of all datasets that meet the selected criteria.
- If the dataset is of one of the supported data formats, then a subset that meets the search requirements is automatically extracted, and a corresponding price calculated.
- Consumers can view the metadata information, including sample images if provided, of each dataset in the list.
- Consumers can view the price of each dataset, which is automatically calculated by the system.
- Consumers can choose to purchase more than one dataset at a time, and these can be supplied by different providers.
- Consumers can add and delete datasets to their basket, and purchase a number of datasets through one transaction.
- Consumers can purchase datasets through the e-commerce facility (credit-card only at present), and this is fully automated.
- Consumers can select the supply and shipping method they prefer (from lists defined by the providers).



- Consumers can choose to receive electronic datasets by either e-mail, http download, or ftp transfer (if these are available methods, and subject to certain conditions).
- Consumer's 3rd party applications can interface directly to MERMAID, and retrieve datasets for immediate use within the application.

6. SUMMARY

6.1. Project Status

The final review for the MERMAID Project occurred at the EU offices in Brussels on 23rd July 2002. The final system prototype was demonstrated to the Project Officer, M Guy Weets, and three independent external reviewers (M. Bernard Donnay, Mr Keith Jeffrey and Prof. Wolf-Fritz Reikert), along with the project documentation, including the Exploitation Plan and the Technical Implementation Plan. The project was deemed as successfully complete, and officially ended at the end of July 2002.

For further details of the project, the project consortium or the project deliverables, please visit the project website at: www.marinedatabroker.com

6.2. Commercial Exploitation

Although the prototype system is fully functional, the project consortium recognise the fact the system is not yet ready for commercial exploitation. There are a number of issues that will need to be resolved before the system can be launched in a truly live environment as a fully functional commercial tool. The outstanding 'technical' issues are addressed in the Technical Implementation Plan (EU deliverable D12.2), and the business and marketing issues are highlighted in the Exploitation Plan (EU Deliverable D12.3). The project consortium are not yet in a position to take the prototype forward to the next phase, which will require further investment, but will be looking for ways to exploit both the system itself, as well as the technologies developed. This will include disseminating the project to as wide an audience as possible through further paper presentations, workshops, and conferences, and looking for 3rd party investment opportunities such as Joint Industry Projects (JIPs).

An internal workshop is planned for the autumn of 2002 at the Met Office in Bracknell, and this is likely to be followed by an external workshop. A paper is also currently being prepared for presentation at the 3rd EUROGOOS Conference in Dec 2002.

6.3. Conclusions

The MERMAID project successfully delivered a fully working prototype of an Internet-based Data Broker aimed at the marine emergency response domain. All of the initial objectives, and the detailed user requirements were met, and the project has therefore demonstrated the technical feasibility of such a broker system. However, the prototype will require some further refinements before being ready for full commercial deployment, and following a full marketing analysis, the project consortium have concluded that the system is not currently commercially viable. Despite this fact, the potential of exploiting the system itself still remains, and the consortium will actively be looking for external investors to develop the system. In addition, many technological lessons have been learnt, which are likely to be exploited by the



consortium partners in other areas. Finally, it is felt that the project has made a positive contribution in the field of environmental data exchange and particularly in the area of metadata. The project has moved a step closer to realising a formalised international metadata standard.

7. CONTACT DETAILS

Project Name:

MERMAID Marine Environmental Response data Management and Acquisition using Internet Data brokerage

Research Area:

Maritime Domain, Environmental Emergency Response, Internet Data Brokerage development

Timescale:

01.01.2000 - 31.07.2002

Budget:

Overall cost: € 2.15 m

European Commission contribution: € 1.1 m

Keywords:

Marine, Oceanography, Meteorology, Environmental Data, Metocean Data Emergency Response, Internet-Data Broker, Metadata Database, E-commerce-facility, Automatic Data Transfer, On-line Data Delivery.

Key Project Participants:

BMT Marine Information Systems Ltd.	(UK)
TXT e-Solutions	(I)
CEDRE	(F)
The Met Office	(UK)
Maritime Branch of the Polish Institute of Meteorology and Water Management	(PI)
Netherlands Coastguard	(N)

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