Technical Report No 44

Guide to Tools

European Topic Centre on Catalogue of Data Sources

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Preface

This technical report summarises the software developments performed by the consortium of the ETC/CDS from the year 1996 to the year 2000. The available instruments went through several phases of user input, refinement and control. They form a well tested toolbox for anybody who wants to register environmental information for the purpose of facilitating and improving the access to this information. The report also provides a description of the CDS data model in its annex.

Over the years, the focus of the developments shifted from single PC-based applications over the support of multiple PC networks to client server solutions and increasingly to internet based applications making use of the easily transferable JAVA development environment. Guiding strategy in the development of this family of applications was and is to supply a set of instruments to a variety of customers with different technical background and platforms in order not to leave anyone behind.

Based on these ETC/CDS developments beyond the EEA itself, several current and future EU countries as well as institutions working on the European environment developed their customised applications. Thus this technical report should also be seen as an encouragement for others to follow up this approach, dependent on their individual needs. For this purpose, the tools and the consulting through the ETC/CDS are offered free of charge to collaborating institutions.

EEA's overall goal in promoting these tools lies in the strong believe that a systematic and consistent usage of metainformation is crucial to the success of information services. In this respect it does not matter whether you decide for classical cataloguing of environmental information or building portals or marketplaces to give access to such information.

Introduction

The European Topic Centre on Catalogue of Data Sources (ETC/CDS) was founded in 1995 in the framework of the European Environment Agency (EEA) as one of nine Topic Centres dealing with various environmental issues. Its work is guided by the mandate of the EEA to provide and give access to up-to-date, harmonised, reliable information on the state of the European environment.

The ETC/CDS collects, maintains and harmonises information about environmental information and data, so-called metainformation. CDS metainformation supplies answers on WHO is responsible for WHAT information in Europe, in WHICH form and WHERE the data exists, as well as HOW to get access to it.

The mission of the ETC/CDS is to conceptualise and implement a locator system on environmental metainformation which includes relevant sources of the EEA network members – the Catalogue of Data Sources (CDS). Also, the ETC/CDS harmonises and promotes concepts for registering and locating environmental metainformation. Based on selection criteria, guided and agreed upon by the EEA and belonging countries (EU15 + 3), ETC/CDS collects and maintains addresses and data sources of the EEA, its member organisations, and 13 PHARE (Eastern European) countries.

In the meantime, the ETC/CDS has established the ”Directory of Information Resources” (DIR), the official directory of EEA’s authoritative information. Being the backbone of EEA’s European Reference Centre on Environmental Information (E2RC), the DIR is a catalogue of well selected and sorted environmental information resources that have been used and produced in the context of the reporting process on the state of Europe’s environment. Built on the electronic cataloguing system CDS, the DIR presents a structured approach towards ‘access to environmental information’.

The ETC/CDS has developed several tools to accomplish its goal to collect, maintain and harmonise European environmental information. The first available tool was the WinCDS, an offline registration software based on MS Windows. Until now, it has been developed into a comprehensive database administration instrument for the MS jet engine database. WinCDS was complemented by WebCDS, the online tool for search and retrieval of the collected metainformation (addresses and data sources). During the years of development and further refinement of the software, WebCDS was extended by a Java application (J-CDS) and an online tool for registering metainformation (WebCDS UpdateModule) to overcome the problems with exchanging different data formats of distributed metainformation. Both tools were refined and finally established in 2000.Furthermore, a prototype of the European Environmental Information Services (EEIS) gateway to remote sensing data was developed, leading to distributed catalogues of the Earth observation community and allowing search and retrieval of both distributed catalogues and the DIR.

All these software tools are supported by the controlled vocabulary of the GEneral Multilingual Environmental Thesaurus (GEMET). GEMET was created by a consortium of international experts, conceptually merging different national (Germany, Netherlands, France, Italy, Spain) and international (UNEP, European Parliament) environmental thesauri. GEMET is used for indexing and retrieval of environmental data sources.

1. WinCDS
Introduction

WinCDS is an MS Windows based catalogue software for registering, retrieving and managing locator information. The tool is build upon a core set of 13 mandatory fields which are essential to adequately describe the information resource. Included are a brief description of the information source and hints to its availability as well as address information. The mandatory fields correspond to the GILS, GELOS and Dublin Core standards, thus furthering the harmonisation of metainformation description in Europe.

The mandatory fields are:

1 title
2 object class
3 date of creation, last update of information resource*
4 last modification of locator record*
5 originator (incl. address information)
6 distributor (incl. address information)
7 administrator (incl. address information)
8 controlled vocabulary (title of thesaurus, terms)
9 spatial coverage
10 temporal coverage
11 language of information resource
12 language of locator record
13 control identifier*

* automatically generated

By registering the mandatory fields via WinCDS, the information seeker is provided with the essential knowledge about what the information resource is about and where and how to find it. In addition to the mandatory fields, WinCDS offers the user to fill in a more comprehensive description of the information resource. Each resource is assigned one of the following record classes: address, project, station/site, document, dataset, map, tool, structuring element

There are always several options to describe environmental data. You may be very precise or accept blind spots which have to be worked out later. As long as there are guidelines right from the start, the software is able to handle later refinements. Therefore try making a master plan before starting to gather information.

Recently, the WinCDS has been further consolidated. It has been developed into a comprehensive administration instrument for the MS jet engine database. ETC/CDS has worked on refining the Export and Import as well as the reporting functionality.

WinCDS has been integrated into the current metadata workflow which is built on the idea of a central database that can be remotely managed and administered. This database, located at the ETC/CDS in Hannover, is a development database invisible to and not accessible by the public. It's sole use is to keep EEA's Directory of Information Resources (DIR) up to date. The development database is being mirrored to the (public) production database

located at EEA, Copenhagen. The production database is a read only application accessible via WebCDS or other applications for a more specialised purpose. WinCDS 2000 is now a fully functional tool for constructing and managing a complex metainformation database.

1.1. Getting started with WinCDS

1.1.1. System Requirements

WinCDS runs virtually on every newer machine (486 and up). Your hard disk requires Space of 20 MB . Memory should be 16 MB RAM at least. The display should be VGA or compatible. WinCDS runs on MS Windows 95 and 98 as well as NT.

1.1.2. Setup and Program Start

The setup program will guide you through the installation process. Before running the program, we recommend making a backup copy of empty.mdb. Empty.mdb contains the database structure that is needed to construct a new CDS catalogue.

WinCDS offers the possibility to enter different database formats with ACCESS being the default. After selecting the database type, selection of an existing database as well as creating a new one is possible. To create a new database, please open an existing one (e.g. empty.mdb, coming with the software), since the software needs to copy the database structure to the new file.

1.2. Addresses

All metainformation in WinCDS is organised in two categories:***Addresses*** and ***Data Sources***. ***Addresses*** are hierarchically divided into organisations and persons**.** A ***Data Source*** may be assigned to one of eight classes and can be of hierarchical structure. Each metainformation object shall be linked to at least one address in order to offer information on the distributor or administrator of the information.

Addresses and ***Data Sources*** shall be indexed with terms from GEMET.

The ***Address*** fields should store information about the person/organisation who collected the data, who is responsible for the data and who distributes the data.

Physically, the database stores each single address only once. However, the address may be linked to many data sources in different types of relations, i.e. as data owner.

1.2.1 Registration of Addresses

The main address information in WinCDS is be registered by using one dedicated mask. The user may choose the class of the address (organisation/person) and then register all available fields. The yellow marked fields are mandatory, i.e. registration is necessary to complete the data set. Fields coloured in light yellow are conditionally mandatory, i.e. if e.g. an eMail address is registered, no further address information is required. The lower part of the address entry form displays possibilities to link other information to the address: other addresses (e.g. parent organisation, child person), related data sources (e.g. Annual Topic Report) and thesaurus terms (currently, GEMET and 'EIONET roles and topics' are possible choices).

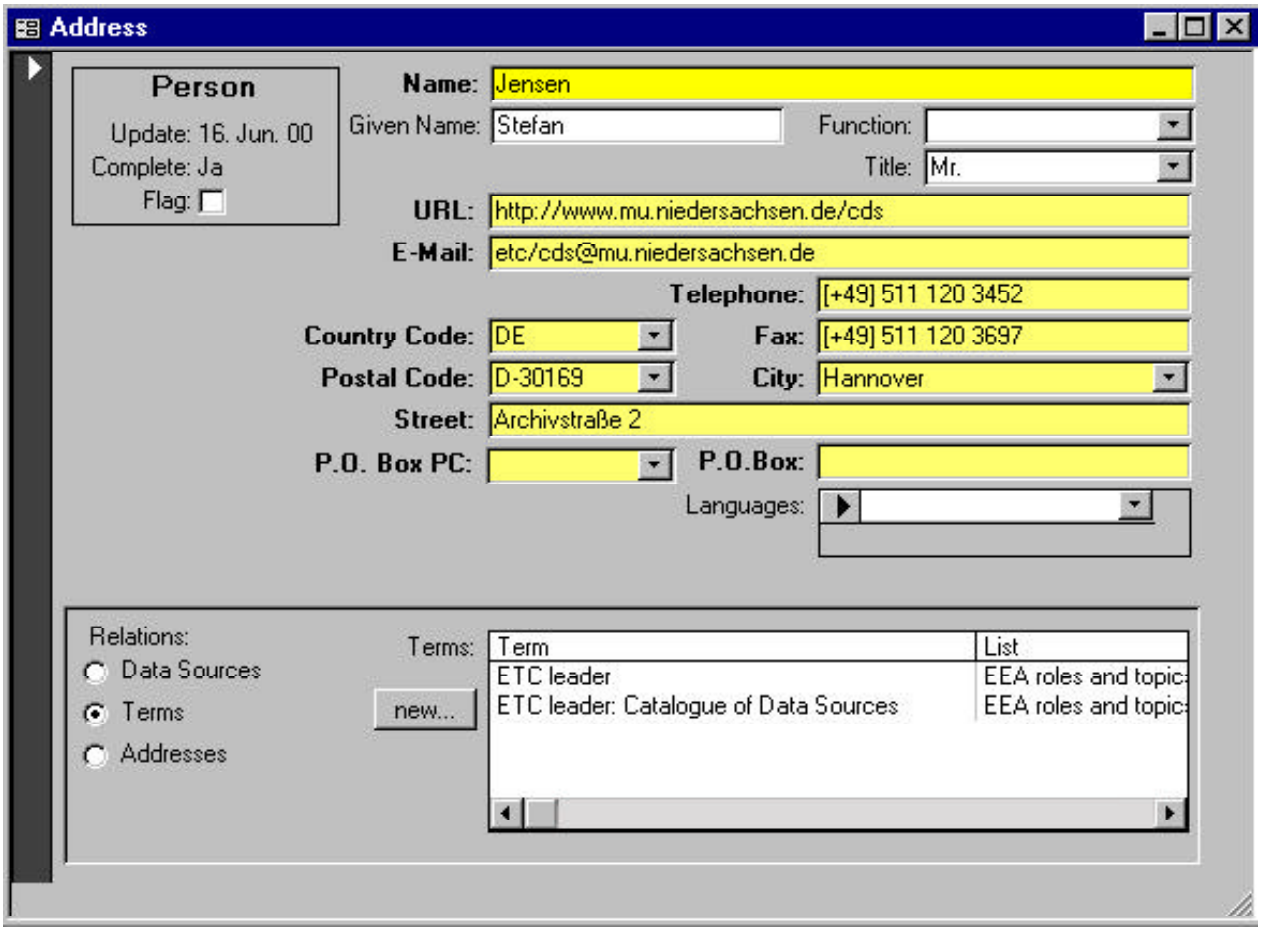


Figure 1: Address form

1.3. Data Sources

The main purpose of the WinCDS is to record, retrieve and maintain metainformation, i.e. information about information and data. This metainformation is stored in the section ***Data Sources***. All WinCDS mandatory fields (displayed in yellow) should be registered to provide a full locator record to the public and thus to enable proper identification of the given information.

In addition to the mandatory fields, WinCDS allows to register comprehensive description of the information resource. Each resource is assigned to one of the following record classes: ***project, dataset, document, station/site, map, tool, structuring element.*** All classes have a common set of fields plus a limited number of special fields which are relevant only for the specific class.

1.3.1. Registration of Data Sources

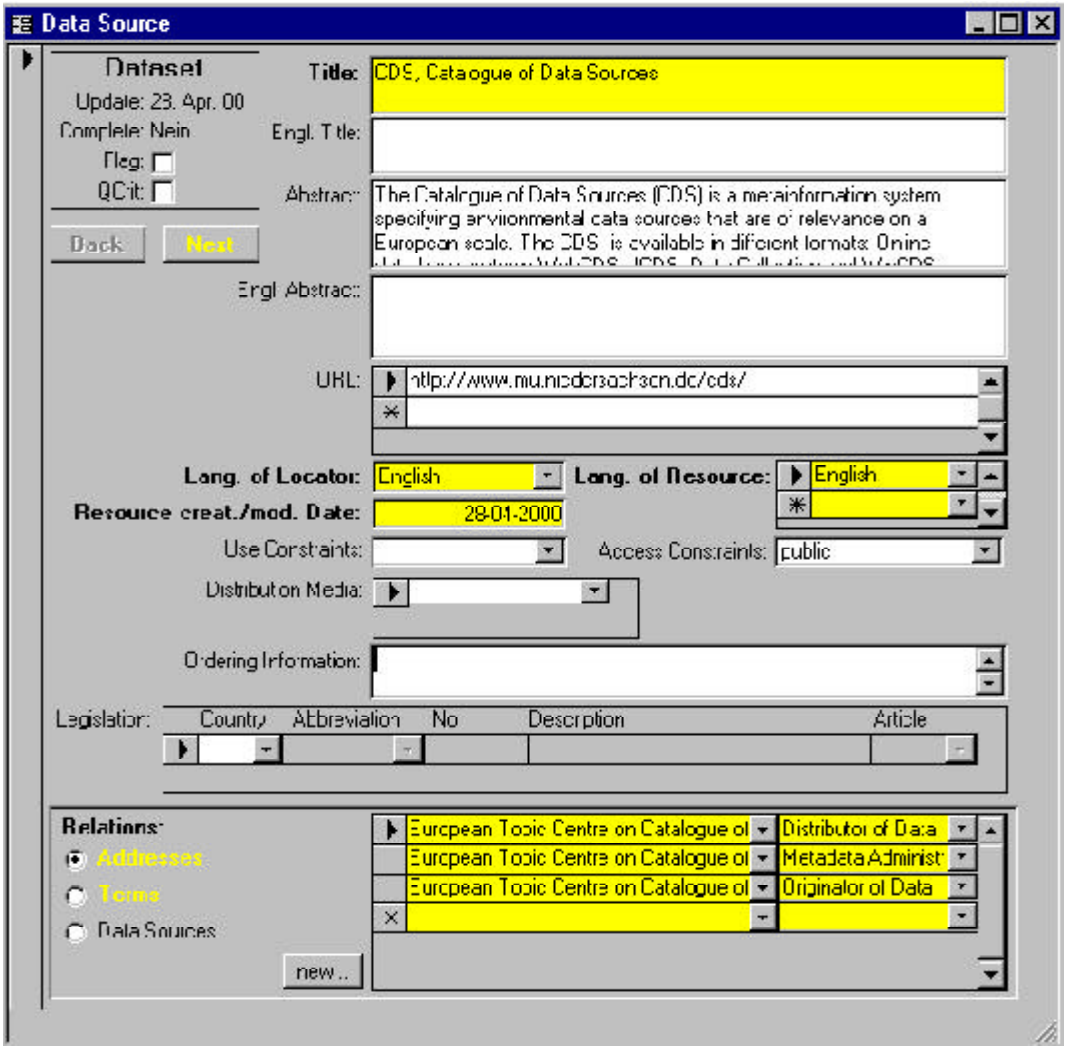


Figure 2: Entry Form for *Data Sources*

Similar to recording a new ***Address***, there are two options for adding a new ***Data Source***:

...**Registration of a single *Data Source*:**
In order to register a new data source, choose **File** from the menu and then select a record class. Each record class has a special entry form. Fill in all available information to receive a proper description of the data source. Please be aware that a data source without any address information is considered to be useless for the user.

...Registration of a sibling to an existing *Data Source*:
By selecting **File/Save as**, part of the original ***Data Source*** information is transferred to the sibling to make data registration more convenient. This is especially useful for registration of several data sets to one parent.
Corresponding to ***Addresses***, you may list the existing data sources alphabetically or hierarchically and select an object from the list. The application queries you to enter a new title for the record. All other information is copied.

1.3.2. Supplements

In addition to the core data source information, WinCDS offers the possibility to register temporal, spatial and technical details. Information on spatial and temporal coverage is mandatory for all object classes, while technical details are optional.

The central part of the ***Next*** entry form holds the element for registration of the details. The user may flip between the respective coverage by selecting the appropriate radio button. The forms for spatial and temporal coverage are identical for all object classes, while the mask for technical coverage differs from class to class.

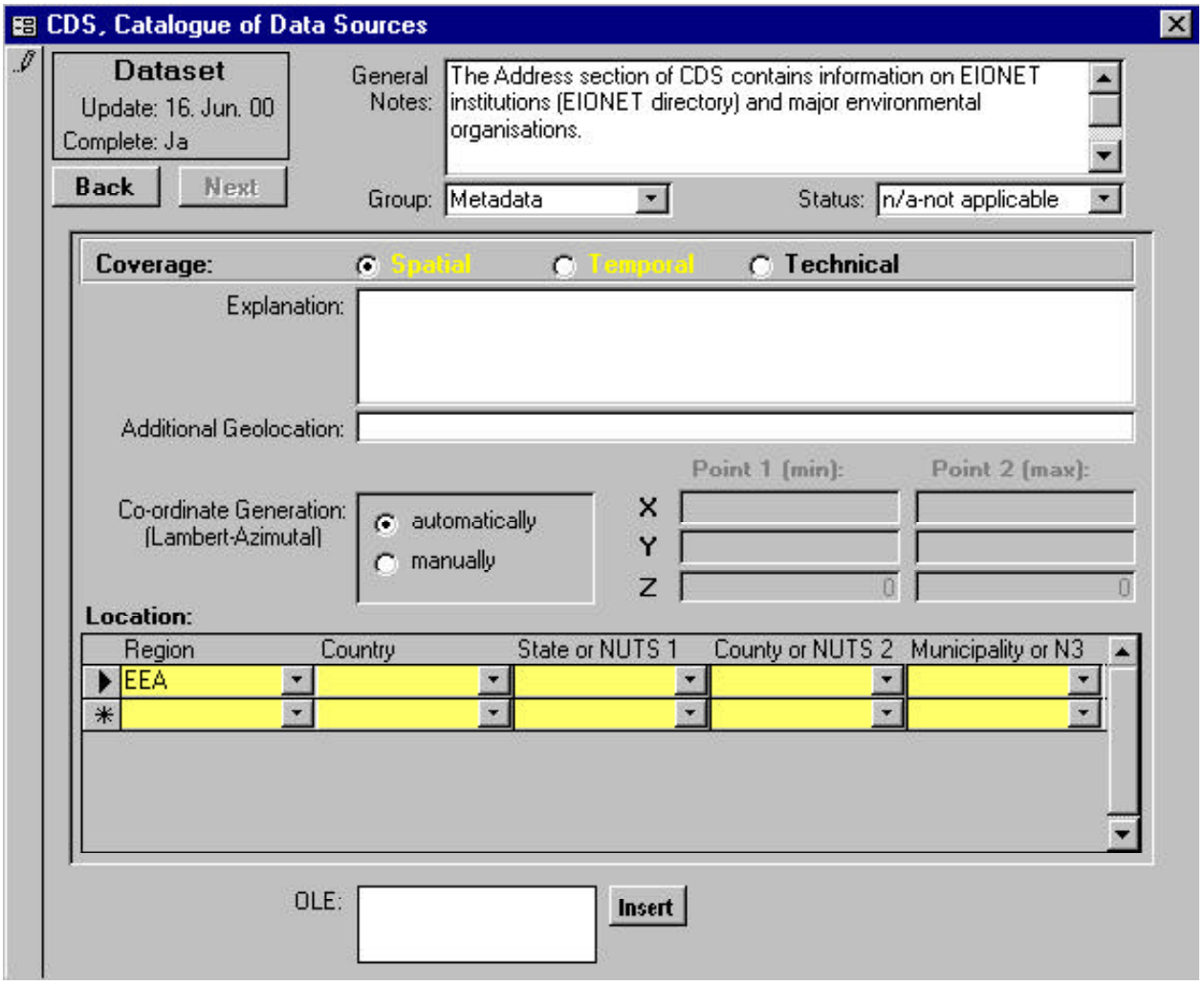


Figure 3: Registration Form for Supplements (spatial and temporal coverage)

1.4. Retrieving Information

There are three ways to search the database for ***Data Sources*** and/or ***Addresses***:

...one
Choose the textual search option from the menu or the binoculars from the toolbar. Enter a search string or name in the appropriate field. The search can be specified by selecting entries from different pick lists, e.g location - country codes, language, legislation. Checkboxes allow specification of the search by using the flag functions.

...two
By selecting the menu item List or the open folder symbol on the toolbar, an alphabetical or hierarchical list of *Data Sources* or *Addresses* is displayed.

...three
Thematic search using the Thesaurus (see also paragraph 1.5: Using the Thesaurus Function). Pick the terms you want to search for from the Terms & Thesauri window. Push the binocular button on the toolbar to start searching the database. A result window displays the results.

1.5. Using the Thesaurus Function

Retrieval and indexing of ***Data Sources*** and ***Addresses*** using the thesaurus have been integrated into a single form. Here, the user can select a term list and the thesaurus language from a pick list.

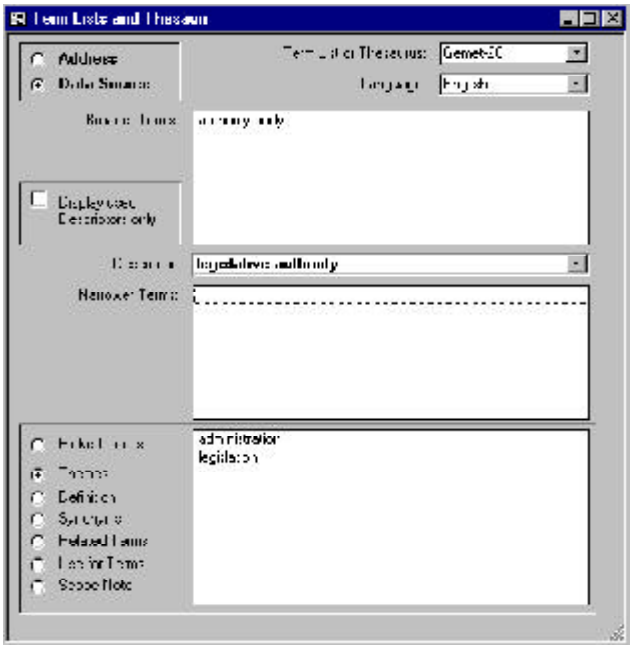


Figure 4: Thesaurus Form

To start the thesaurus function, select **Terms and Thesauri** from the **Tools** menu. This will open the menu, applicable for both ***Addresses*** and ***Data Sources***. Currently, two thesauri are implemented to choose from: the GEneral Multilingual Environmental Thesaurus GEMET and the list of EIONET roles and topics.

The list of picked terms is active until you close the form. This feature allows a switch between the Thesaurus form and the Address or Data Source mode moving to different records without losing the list of terms.

Hence you may define a term list once and attach the terms to various data sources.

Furthermore you may edit the list of terms using the functions Delete picked term and Delete all picked terms from the menu to drop one or all terms from the list.

When using the list of picked terms to search within WinCDS, each search is stored in a separate table. Thus, you may always come back to a search you performed earlier. Select the **Search Definitions** item from the **Tools** menu to see a list of all performed queries. Once you open an old search, the software reruns the search query. This feature simplifies the process of performing a special query frequently.

1.6. Printing an Object

WinCDS offers several ways of printing objects: Via the special ***Data Source*** or ***Address*** forms, or via the feature **Textual Search**.

...from the *Address* or *Data Source* form

Select ***Addresses*** or ***Data Source*** from Main Form	Opens ***Address*** or ***Data Source*** form.
Select **Print** from **File** menu	Opens **Print** form
Select **print format** from **pick list**	Opens check list
Check **Fields** to preview or print or choose **records** to be printed	Only selected items will be printed. Leave dialog by clicking on open door.
Enter **Print Preview** or **Print** buttons	Previews or prints selected format

...from the Textual Search form

select **Textual Search** from **Search** menu	opens **Textual Search** window
push **Binoculars**	starts search
enter Text string to search	
push **Printer** button	opens **Print** form
select **list format**	opens checklist
check **Fields** to preview or print	only selected items will be printed/previewed
push **Print Preview** or **Print** buttons	previews or prints selected format

1.7. Export and Import of Databases

WinCDS offers the option to import or export metainformation records using the SGML format. SGML stands for Structured General Markup Language. It is a widely spread and very flexible library standard.

1.7.1. SGML Export

It is possible to export

- the complete database
- predefined record collections
- single records

To export CDS data, select the **SGML Export** from the main **File** menu. Choose the format of the export, either *CDS*, *GELOS*, or *Thesaurus Export*. Select ***Data Sources*** or ***Addresses*** from the buttons and choose respective datasets from the picklist. Close the form by entering the open door. Hit the **Go!** button to enter a name for the export target file and then perform the export.

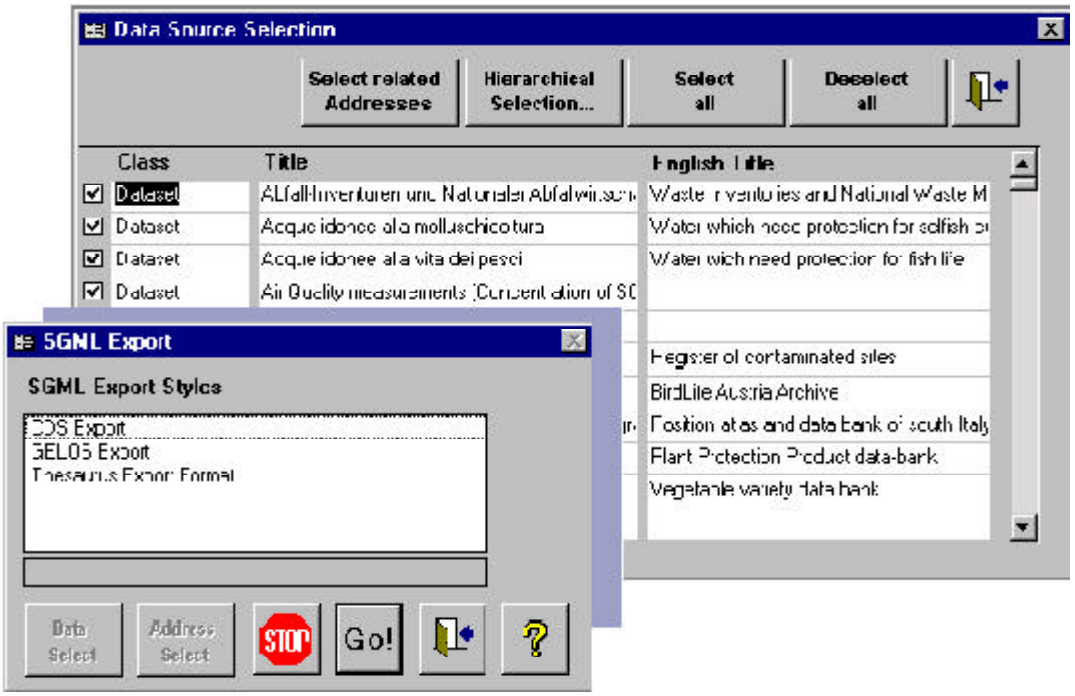


Figure 5: Export Dialogue Form and CDS Data Source selection picklist.

1.7.2. SGML Import

To import CDS data, the user has to open a database first. Select **SGML Import** from the **File** menu to open the import dialog window. Select the file to be imported in the browser. The import starts by hitting the **Open** button.

The user may choose to import into an empty database (open the file empty.mdb as the target .mdb first) or into a database that is already populated (first open the database the SGML file shall be imported into).

During import, the program checks for redundancy, i.e. whether a record does already exist in the target database. Should this be the case the existing record will be overwritten when the 'new' record has a 'younger' timestamp.

Please note that WinCDS does only accept CDS input format.

2. WebCDS
Introduction

To provide global access to the CDS data via the Internet, WebCDS has been developed. The main task of WebCDS is to give access to the Directory of Information Resources (DIR) for a wide user community coming from public authorities; members of the European Environment Agency (EEA) and its network, the EIONET (Environmental Information and Observation NETwork), and associated countries (e.g. PHARE countries), as well as the general public. While the collection and maintenance of CDS data is done by using the Windows-based software WinCDS, WebCDS enables and assists search and retrieval of ***Data Sources*** and ***Addresses*** within the DIR. The advantages of the web – e.g. global access to software and data, minimum installation effort at client stations, platform independence – convinced the WebCDS users to use WebCDS not only as a retrieval tool but also for collecting and maintaining the CDS data via the Web (see WebCDS UpdateModule).

2.1. WebCDS architecture

WebCDS was developed with the aim to achieve independence of client and server platforms, Database Management Systems (DBMS), and web servers, as well as user friendliness and easy extensibility. In order to achieve this, an additional layer between server and client was introduced, which detaches WebCDS completely from the web server. The approach incorporates Java, JDBC, RMI, servlets and HTML.

WebCDS is designed as a 3-tier architecture (figure 1) where the WebCDS application server is the core element. It receives the requests from the clients (HTML- and Java-CDS) transforms the request objects to proper SQL statements and sends them to the CDS database. After receiving the results, it encapsulates them into result objects and sends them back to the clients. The WebCDS application server is implemented as an RMI server. Server and clients are written entirely in Java.

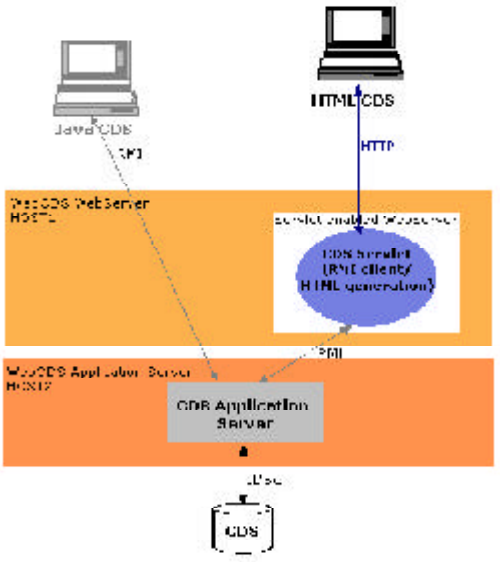


Figure 6: WebCDS general architecture

All software modules (web server, application server, database server) are currently installed on the same workstation, although the general architecture supports a distribution of the components. Due to the client-server architecture, one server for each single component is possible for load balancing.

WebCDS supports two types of clients: an HTML based client and a Java based one. The CDS servlet converts the results into HTML (HTML generation engine) to present them in any HTML 3.2 capable web browser. Therefore, only a standard web browser and an Internet connection are needed on the user site.

The Java based **J-CDS** accesses the CDS application directly via RMI and therefore requires specific ports for bi-directional communication as well as a browser plug-in.
J-CDS includes Java applets for specific search features i.e. map based search, thesaurus search and browsing through the database content. They are, like the results, displayed in an integrated desktop on the user's [Java enabled] web browser.

The range of WebCDS applications is completed by the **UpdateModule** for online registration of metainformation. This tool offers direct access to the database for keeping the information up to date by access-entitled metainformation administrators.

2.1.1. Functions of WebCDS

The basic function of WebCDS is the search and retrieval of CDS metainformation. For this purpose, and with respect to the different data stored in the catalogue, the catalogue system supports two different search types: a data source search and an address search. Both a quick search and an expert search function are implemented for the different data types. Thus, the user is given opportunity to refine the search and add more constraints to the request. Furthermore there is a thematic search feature offering the possibility to search for the environmental topics of the GEneral Multilingual Environmental Thesaurus (GEMET). Both ***Data Sources*** and ***Addresses*** are indexed with terms of GEMET for better retrieval.

2.2. Working with WebCDS

2.2.1. User Interface

When you enter the WebCDS, you may so far choose between eight languages for the user interface (English, French, Norwegian, German, Greek, Spanish, Italian, Portuguese).

The user interface is clearly structured and follows an easy principle (see Figure 7): It is divided into three categories and is 'readable' from the left to the right like a book. The left frame (1) displays general functions / sections (***Data Sources***, ***Addresses, Topic Search***, ***Printfolder*** etc.). The middle section (2) provides a search interface for the Quick Search or Expert Search and the right frame (3) displays the search results. By mouse-click on one of the search results, details (4) of the found object(s) are shown in the middle section.

Figure 7: WebCDS User Interface

The Detailed Information allows direct turn to *parent* or *child* data, related data or addresses, connection to an offered URL, transmission of emails to the provided contact person of a ***Data Source*** or ***Address***.
Furthermore WebCDS offers possibility to select search results of different searches (see check boxes in frame 3) and store them in a **printfolder**. Before closing WebCDS after a search session, the user is able to print the stored results or save them on his local machine for further preparation.

2.2.2. Multilinguality

...in the graphical user interface (GUI)
The CDS is a catalogue used all over Europe. Hence, support of several languages is one of the major requirements. In contrast to other settings such as local area networks, the Internet is a challenge for multilingual applications because of its global character. Usually, English is used to support access to local data for the international public. However, this approach is insufficient when, like in WebCDS, the user is searching for data in his mother tongue.

Therefore, WebCDS gives opportunity to search for data in several languages via a multilingual user interface: The language for search forms and result pages may be chosen. This implies that all visible fields are language sensitive. For this purpose, WebCDS uses the resource bundle functionality as suggested by the internationalisation specification for Java. The resource bundle approach offers

possibility to switch between different languages, with the special advantage of an easy extensibility of the catalogue system.

... in the data presentation
The second aspect, which cannot be solved by this approach, is the presentation of multilingual data. In an ideal case, all data retrieved from the catalogue are represented in the chosen language for the user interface. As this is not possible without translating all data into all supported languages, the catalogue system supports multilingual representations as far as possible.

... in the search functionality
CDS tools (Thesshow, UpdateModule, WinCDS) support the indexing of ***Data Sources*** and ***Addresses*** with terms from the multilingual harmonised thesaurus GEMET. This ideally means that all available data in the DIR are indexed with keywords/terms of GEMET. Thus, retrieval of data is language independent: WebCDS routinely searches for all translations of the keyword and displays the thesaurus descriptor (keywords/terms) in the chosen GUI language instead of the language that was initially used for indexing.

As opposed to the rather passive multilingual search functionality in WebCDS, a more interactive one is available in J-CDS through the function **Keywords**. Here, navigation through the thesaurus as well as searching the thesaurus for the appropriate keyword fitting one's needs are supported features.

3. J-CDS - The Java Client for the Catalogue of Data Sources

Introduction

In the course of refining the functionality of the WebCDS, the idea of a Java Client for the Catalogue of Data Sources (J-CDS) was born. J-CDS adds more search functionality and better visualisation to the CDS data search. It integrates and combines three Java tools to facilitate retrieval of metainformation.

The main reason to implement a Java based search facility has been the user need for more functionality in searching a database. The following new features are realised within J-CDS:

- enable easy navigation through the hierarchy of the CDS database entries and therefore a totally different approach to search
- enable a map based search by setting a bounding box or selecting an administrative unit in different levels
- enable the full integration and use of the General Multilingual Environmental Thesaurus (GEMET) for searching the CDS database

With these three main features the J-CDS is a powerful search facility offering new and important modules like the GEMET to increase the performance and the usability of the CDS retrieval tools.

3.1. Requirements

...installation of Java Plug-In
As long as the Java 1.1 support of the Browser does not include 100% Java compliance, J-CDS needs a Java Plug-In to be installed at the client site. The Version needed is 1.1.2 and can be downloaded from the SUN site http://java.sun.com/products/plugin/1.1.2/index-1.1.2.html. Please do not use any other version.

...firewall requirements
J-CDS Client communicates with the application server through remote method invocation (RMI). Like all Internet protocols (HTTP, FTP etc.), RMI needs ports for communication. These ports are configurable. Where a firewall is installed between J-CDS client (user's local machine) and J-CDS server, these ports have to be opened to allow bidirectional communication. The current installation of J-CDS uses ports 3000, 3001, and 3002.

3.2. Functions of J-CDS

J-CDS combines three independent modules (Java applets), whose specific search features may also be combined.

- GeoView (**Location**) is an easy to use tool for spatial access. It allows zooming, moving in a European map and selection of countries and bounding boxes in different levels of the map.
- GenThes (**Keywords**) allows navigation within the terms and hierarchies of the GEMET thesaurus. Besides a search for thesaurus descriptors and synonyms, GenThes supports browsing in the thesaurus hierarchy, detailed description, and translation of selected terms in 12 languages. The user can select one or more terms and start a search in the CDS ***Data***

Sources. To search for addresses within GenThes, the EEA roles and topics hierarchy can be accessed and displayed. Other thesauri may be added in the future.

- The **Navigator** allows to browse ***Addresses*** and ***Data Sources*** of the CDS database. The user can navigate through the hierarchy and select an object of interest to view detailed information.

Independent of the selected module, the results are collected in a result list window where the specific search criteria (selected by keyword, location or navigation) may be combined to refine the search settings or add a new search. The user may combine the results of different searches either by just **keeping** the old results in the list or by **comparing** them with the new search criteria or just **delete** (default) them.

To display the detailed information of each search result, a mini browser was implemented which shows the results by accessing the HTML engine of WebCDS. The mini browser allows survey of all detailed information of the search session using the back and forward buttons. Additionally, it offers the possibility to save or print the detailed information, a benefit which is currently impossible in other Java applications.
For saving or printing, the results are transferred and displayed in the local Internet browser (e.g. Netscape) where standard functions like print or save are available.

3.3. How to use J-CDS

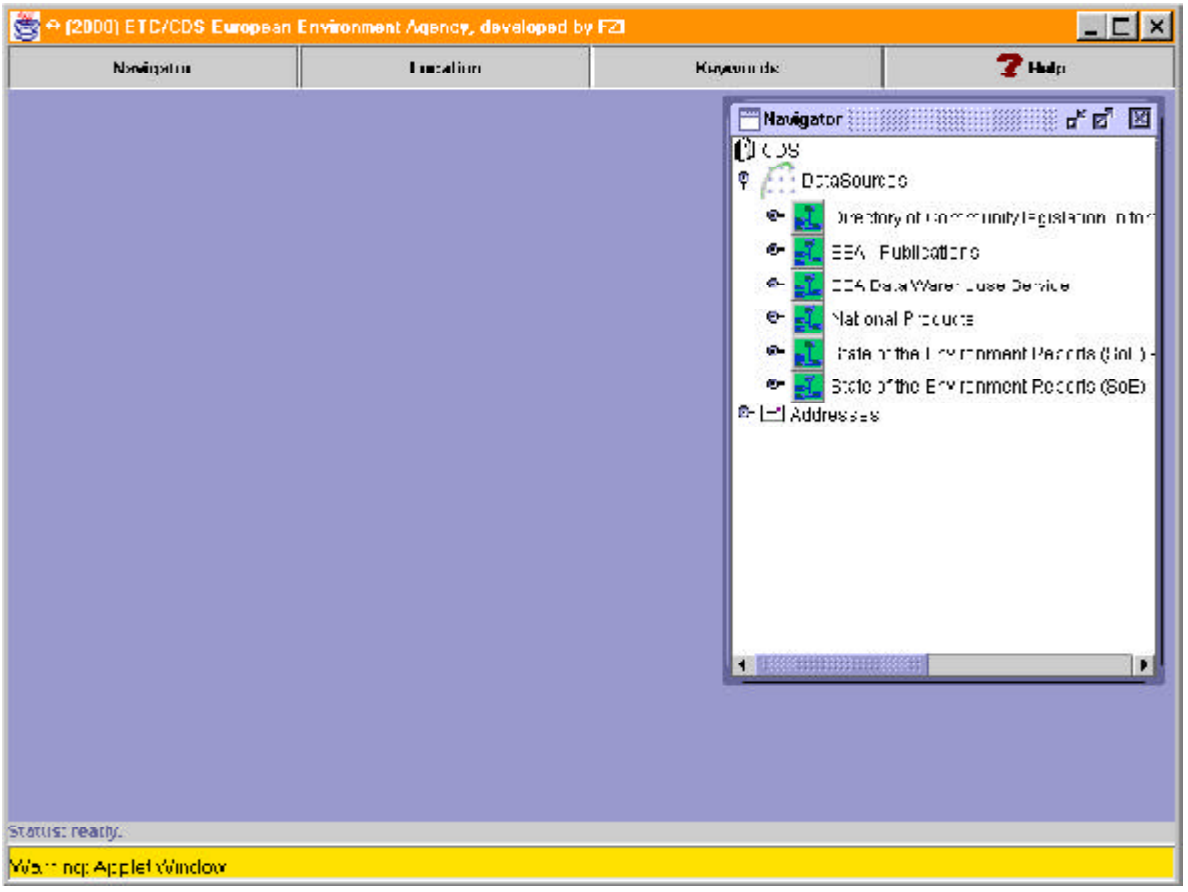


Figure 8: Startpage of J-CDS

The current Version of J-CDS consists of three search modules which are all accessible within the J-CDS desktop and through the main menu. The main menu (at the top of the applet) consists of four buttons, three corresponding to each tool, plus **Help** button.

Each module appears as internal frame within the J-CDS desktop and will take some time to load at the first time. Once initialised, the components are available fast (cached). On the bottom of the frame, you will find a status bar, showing information about the whereabouts of the loading process and all activities of the applet in general.

3.3.1. Navigator

The Navigator shows the hierarchy within ***Data Sources*** and ***Addresses***. Browsing through the CDS database and retrieving metainformation is easily possible by selecting one item (e.g. person, document, map, ...) via mouse click. The appearing 'Detail' window gives exhaustive information of the selected item.

3.3.2. Location

Location initalises the GeoView applet which is a map based retrieval module for CDS data. It covers a map of Europe, aggregated from GISCO data, in which you can navigate, zoom and select a country or bounding box in different map levels (currently only one level).

You may change the map level or enter a more detailed map by pushing . Select a bounding box or administrative units by mouse click on the corresponding button or make use of the zoomfunction . It is also possible to move the map . To search for data, the user needs to select at least one administrative unit or set a bounding box and enter the **Start Search** button at the bottom of the frame.

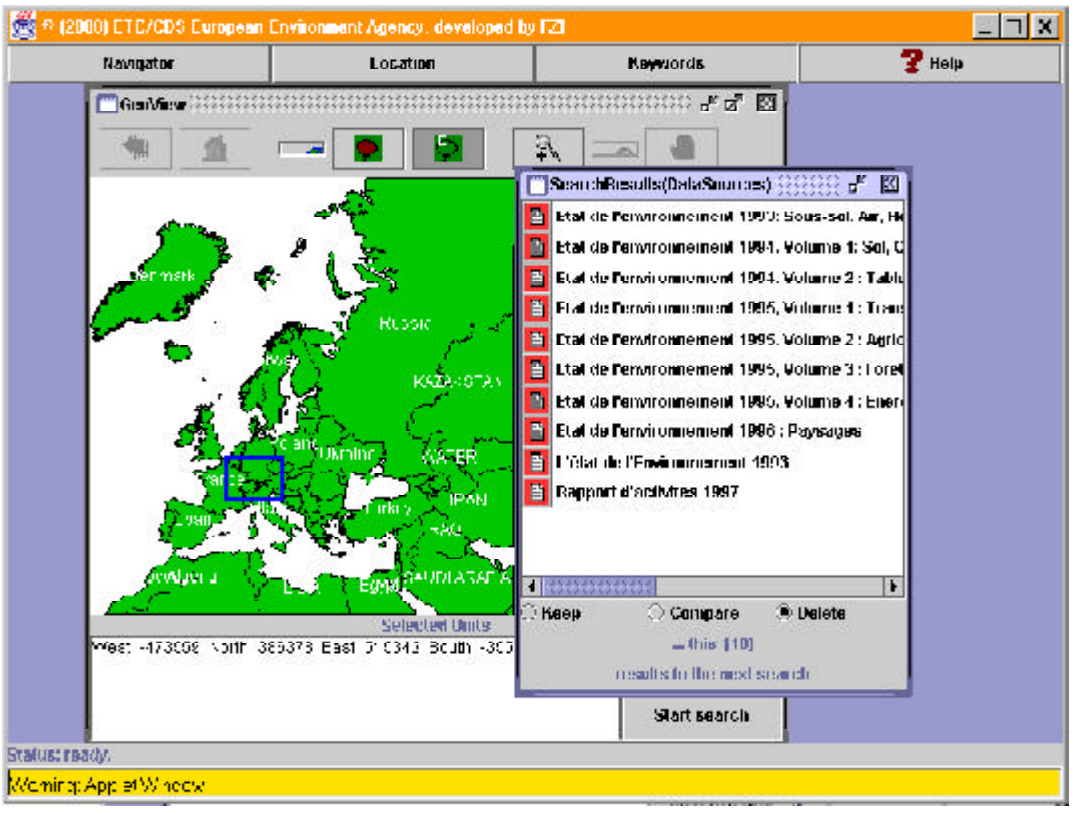


Figure 9: View on Location Window

3.3.3. Keywords

Keywords initialises the GenThes module, a tool for retrieval of CDS data by using different thesauri i.g. GEMET and EEA Roles and Topics. ***Data Sources*** and ***Addresses*** may be searched by using different thesauri. Generally speaking, the user is able to choose between supported thesauri (which may be own thesauri also). GenThes offers following functions:

- ***Hierarchy*** displays the hierarchy of the terms of the selected thesaurus. If you have selected a term in another tabbed folder and switch to the hierarchy, the first place of this term in the hierarchy is displayed. If this term appears more than once, the **search all paths** button is activated. By pressing this button, all appearances of the selected term are displayed.
- ***Detail*** shows more detailed information of the selected term. Within this folder, you are once more able to navigate through the hierarchies of the selected thesaurus and to display the definitions of the terms.
- ***Search*** enables the user to search for thesaurus terms.
- ***Translation*** shows the selected term in all available languages.

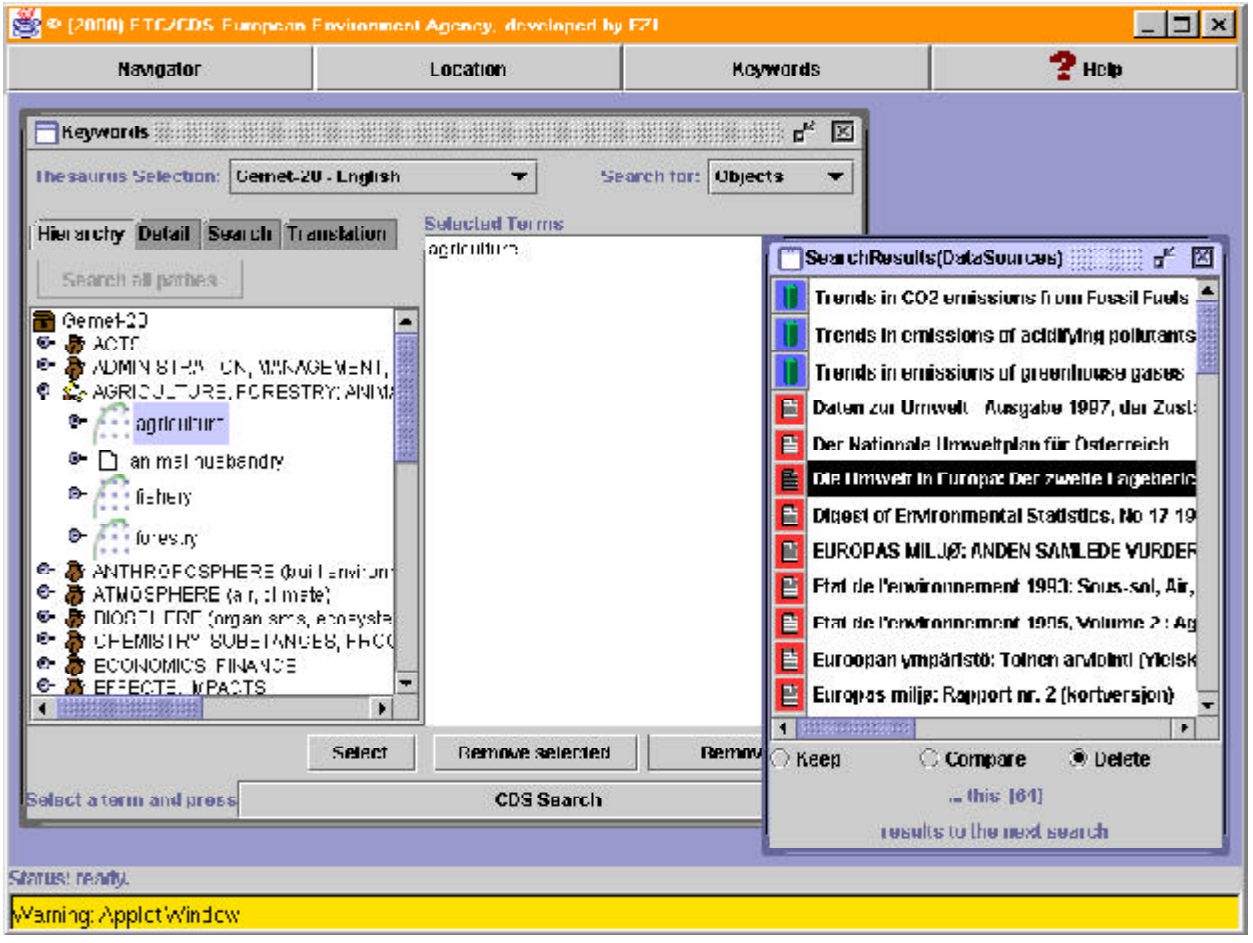


Figure 10: Detail Window

While browsing through the thesaurus hierarchy, the ETC/CDS logo and a mailfolder indicate that there are ***Data Sources*** / ***Addresses*** associated with a term. The parenthesis after a term indicates the number of data or addresses associated with the term, e.g. water [5]. An (s) after the term indicates its function as a synonym. Once you have selected a term via the **Select** button, start a search by pressing **CDS Search**. As soon as the search is completed, the search result list will appear in another window.

3.3.4. Search Result List

The search results are short listed and by double click on one item the user gets more detailed information. The buttons **Keep**, **Compare** and **Delete** allow the combination of two or more search result lists.

Use **Keep** to hold the current results in the folder, which will be out-greyed (see figure below) for easy recognition after a new search. **Compare** offers the opportunity to merge different searches by using a second search criterium (keyword or location). The result list does only show results matching both search criteria. Use **Delete** to cancel the old results and begin a fresh list with the actual ones.

Please be aware that you have to select these functions before setting a new search!

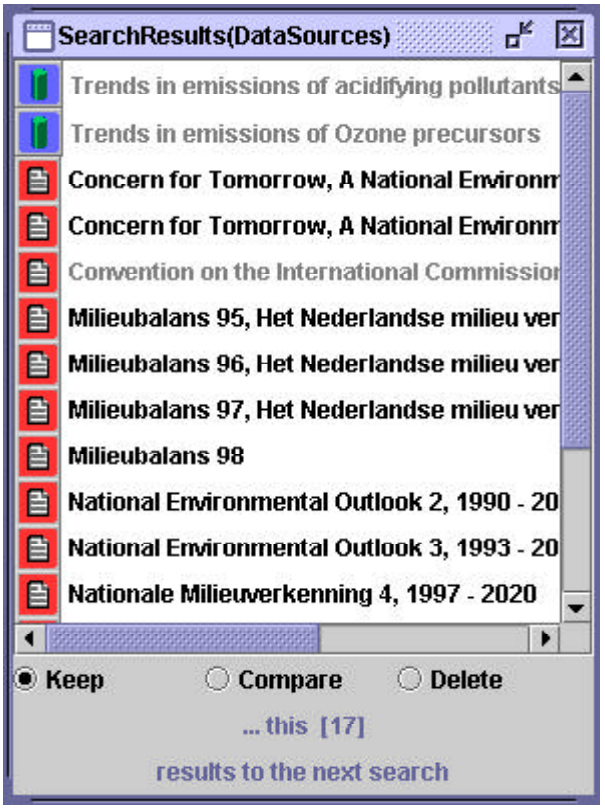


Figure 11: Result List

3.3.5. Detailed Information

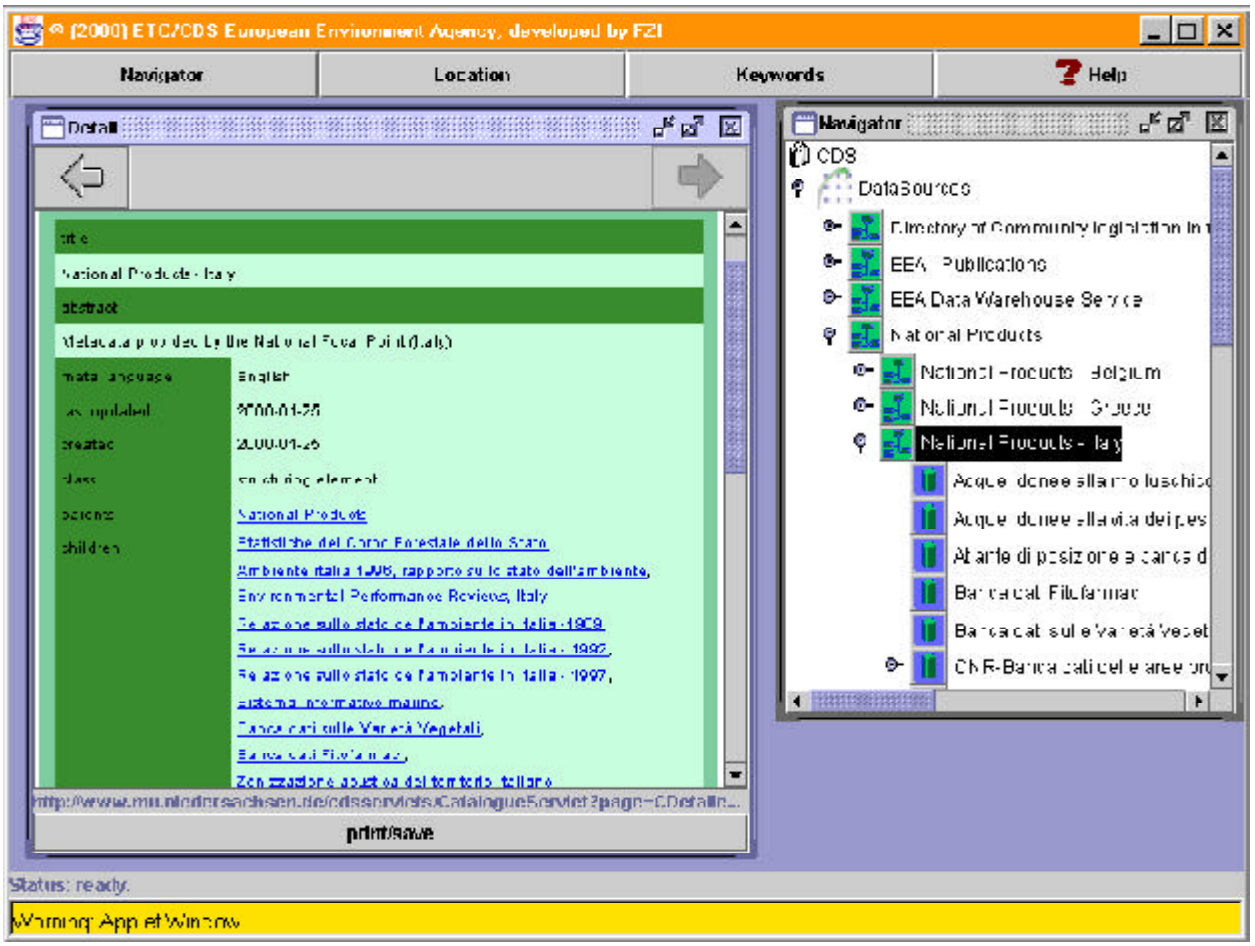


Figure 12: Detailed Information

The detailed information about an ***Address*** or ***Data Source*** is displayed in a simple HTML browser (implemented in Java) with two navigation buttons at the top of its frame. You can directly use URL or eMail links (if provided) to get more information or contact.

Furthermore, there are links to parent data, child data, related data or addresses.

3.3.6. Print/ Save Results

A great benefit of the J-CDS is its possibility to enable save and print functionality on the user's desktop, which is normally not intended for Java applets. To enable print, save or transfer the results of a session to its local environment. The data is loaded into an external HTML browser window (e.g. Internet Explorer or Netscape Navigator) for further subsequent treatment by using the ***print/save*** button.

4. WebCDS UpdateModule

Introduction

The web-based UpdateModule for the CDS has been developed in co-operation with the Swiss Agency for the Environment, Forests and Landscape (SAEFL). Main goal was to overcome the problems with exchanging different data formats of distributed metainformation. The new approach provides direct access to the CDS database via the Internet. It was designed to simplify the update process for providing timely and reliable information.

Due to the pure Java development, the whole service is platform independent and is to run on virtually every client and server platform (Java 1.1 and Swing enabled). The use of Java Swing technology allows a WINDOWS-like look and feel for a comfortable user interface.

Since client and server communicate via RMI (Remote Method Invocation) over the web, some ports have to be opened to ensure proper interaction. These ports are statically defined and have to be open in possibly existing firewalls before installing the UpdateModule. The client's queries and updates are send to the database server, where they are transformed into the appropriate form and sent to the database. The access (reading and writing rights) to the database is handled by user management (ID, password, super user, etc.).

Every time you want to update your metadata in the CDS, you may start the application on your local PC (which has to be connected to the Internet), log-in with ID and password for the specified database (e.g. the CDS database), make your necessary changes or inputs and transmit them directly to the database.

The UpdateModule offers a range of functionality but also tries to keep the process as simple as possible. You can
· search for all existing data in the database
· search and change your own data
· register new data
A pre-defined super user (e.g ETC/CDS) has access to all data for quality control and administrative issues.

The update tool is originally foreseen for selected CDS metadata distributors. But you may also use the complete CDS application for your individual national or scientific approach.

4.1. User requirements

The performance of the WebCDS Update Module is connected tightly to the internet performance. All communication to server and database is transmitted over the web. Thus, slow internet connections strongly affect the speed of the tool. In order to achieve better performance, all non-changing data (e.g. NUTS Codes, country names, languages etc.) are cached locally. To enable a faster reload, cards are cached as well. Please be aware that the more parallel processes are opened, the slower is the performance.

4.2. Architecture

The WebCDS UpdateModule is build upon a server-client architecture. The interaction of user and database is diverted to the database server which directs the user's queries to the database and receives its results.. The database server serves as *interaction layer* between the client GUI (Graphical User Interface) and the database. It consists of a search engine which receives the search queries sent by the GUI and an update engine which puts the queries for data change into the appropriate form and directs them to the database. The results of those queries are send from the database to the database server which hands them over to the GUI. All three communication partners (database, database server, client) may be at different locations and communicate over the web. The architecture of the system is shown in Figure 13.

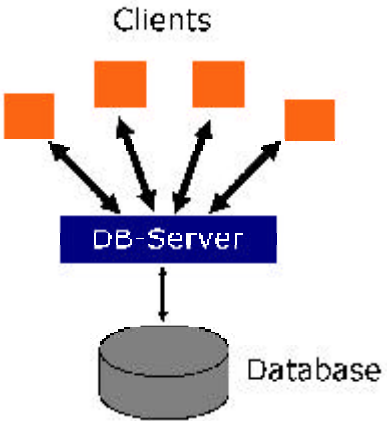


Figure 13: Architecture of the WebCDS Update Module

The update system is split into four modules: The *database* module contains all classes responsible for functions of the database server. The *client* module, taking over the role of the client in the interaction with the database server, realises the functionality of the update module. The classes in the *data_carriers* module carry all data relevant for interaction between the database server and the update module. The classes in the *gui_elements* module represent the graphical elements used on the search window of the update module.

The data structure of the UpdateModule has been separated from the running program in order to be able to make independent changes in one of the parts. Between these modules, any bidirectional dependecies should be kept aside. The modules and their dependencies are shown in the following figure.

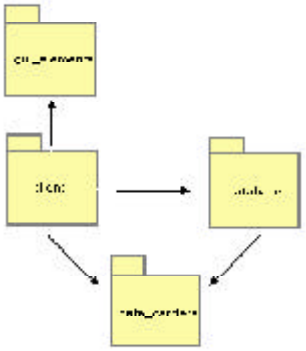


Figure 14: Dependencies of Modules

4.3. General

In the catalogue system exist different levels of *actors*. An actor can be a person or a system. There are four different actors dealing with WebCDS:

- *Interested parties* who search the database
- *Authorised users*, who are researching in the database and are able to modify data sets
- *Administrators* who are able to manipulate the database as well as authorise users
- a *DBMS* in which the data sets of the system are stored

4.4. Using WebCDS Update Module

To use the WebCDS UpdateModule, the user must have a valid user name and password (to be gained at the administrator). He has to specify the database he wants to be connected with and the language. After the login, the *Main Window* (*MainFrame*) is opened. The main window contains three menus namely *Dataset*, *Extra* and *Help*.

4.4.1 Dataset

By choosing the menu item **New...**, the user can specify the record class of the new data set. Supported record classes are similar to those available in WinCDS: *address, project, station/site, document, dataset, map, tool, structural element*. Further, a brief registration based on the GELOS fields is possible.

The user has to fill in several cards (shown as tabbed folders) for each record and submits the cards (**transmit all** button) to the database. Mandatory fields have to be filled, otherwise an error message reminds the user to do so.
Mandatory fields are, corresponding to WinCDS, marked yellow so that the user can distinguish them easily from optional fields. The main tabbed folder of the *GELOS* card is shown in Figure 15.

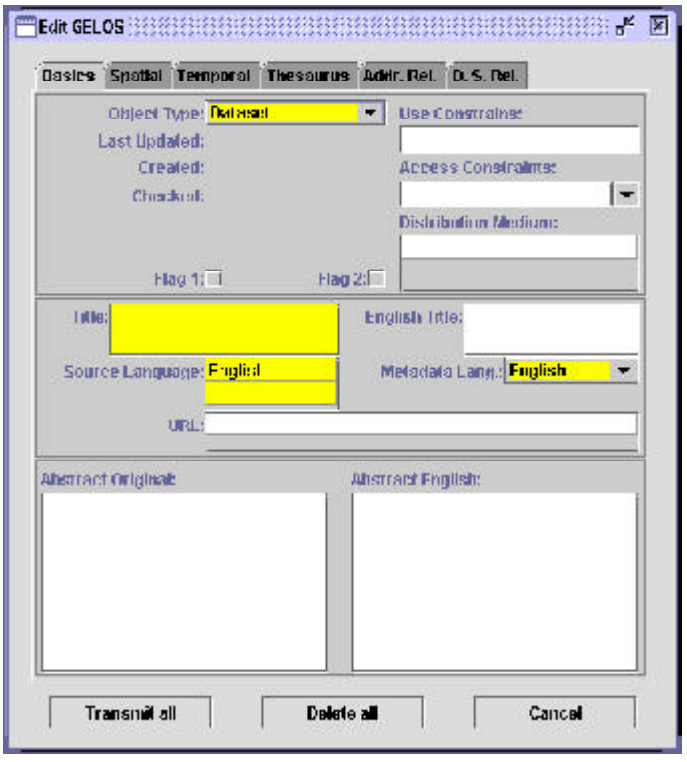


Figure 15: Basic Tabbed Folder of GELOS

Addresses: Parent-Child relations can be defined between *Persons* and *Organisations*. The relations to several data sources (*is Distributor of, is Originator of*, *is Metadata Administrator of*) can be specified.
Data Sources*:* When creating a new data source, the user can define the *Distributor of Data*, the *Originator of Data*, the *Metadata Administrator* and the parent/child data sources of the described data source. By clicking on the **List** button, a CDS Navigator internal frame will open and the user may select the ***Addresses*** and ***Data Sources*** he wants to link to the data set being created.

In order to specify the region and the countries a data source covers, *NUTS Codes* may be entered and *Bounding Boxes* can be. The user may also specify the *Time Interval, Update Period* and *Time Period covered* by the described Data Source as well as the date of its creation.

Persons, Organisations and classes of ***Data Sources*** should be indexed with Thesaurus terms (GEMET 2.0) and, if necessary, free terms. Thesaurus terms can be chosen by using the integrated GenThes (Java tool allowing access on and use of thesauri, see Figure 16), free terms can be entered into the respective text fields. The user may enter multiple thesaurus terms and multiple free terms.

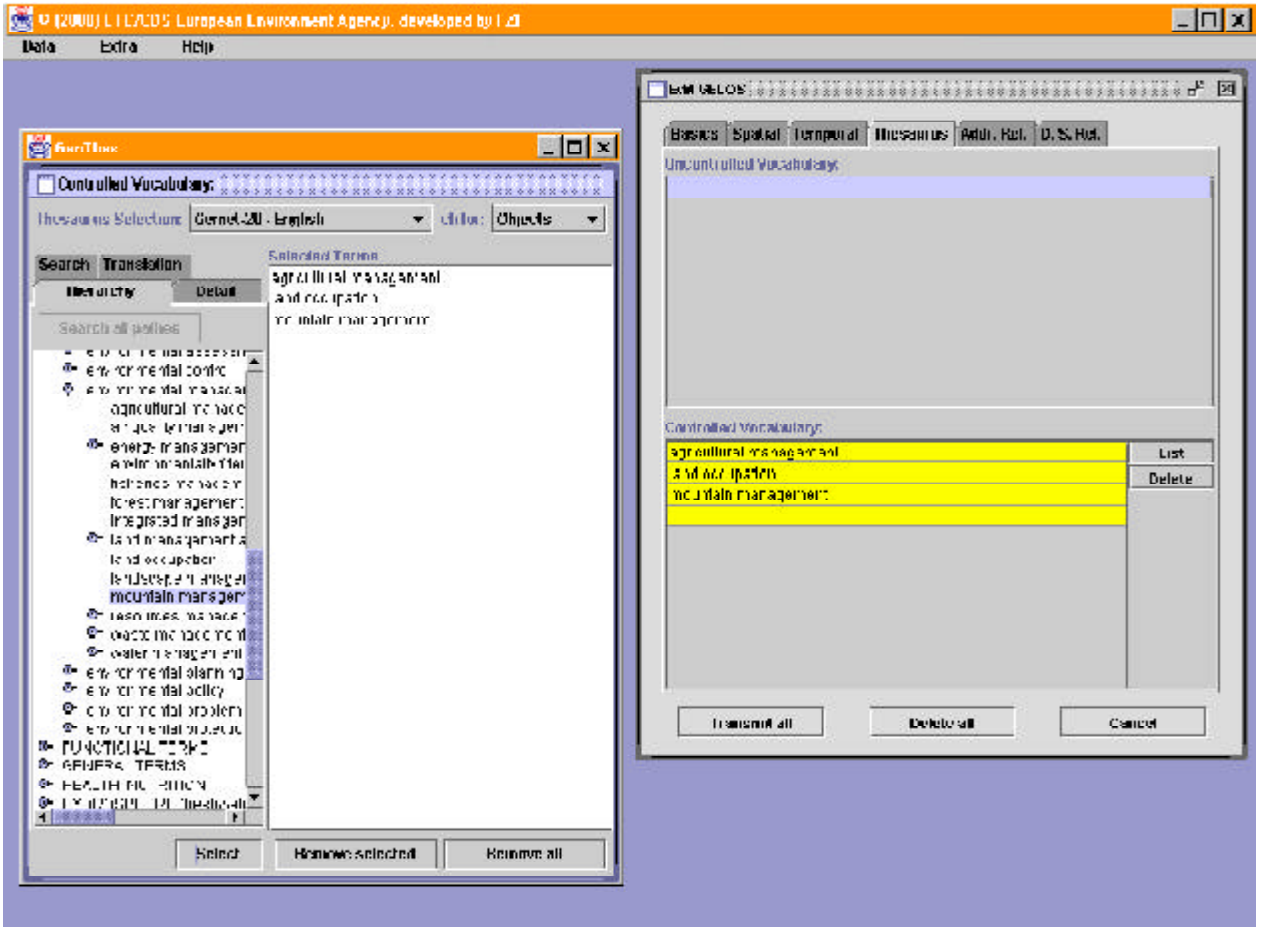


Figure 16: Thesaurus and Free Terms

Every data source card contains a card *Technical* where the user can register technical information depending on the class of the data set he has chosen to create.

By choosing the menu item **Find**, the *Search Window* will open. It contains three tabbed folders:

- *Basic* (Figure 17): specify the type of data, a search string and the database field to be searched in (pick list). This string can either be searched for as substring or as complete term. All translation will automatically translate a used GEMET keyword and search with all available languages of GEMET. Three check boxes offer to search for your data only) and/or for special flagged (flag1, flag2) data sets (Flag 1 and 2 may be defined individually. The inscription of the corresponding flags can be changed easily by editing the entries (find_ge1.1_type1 and find_ge1.1_type1) in the property file common_xx.properties)

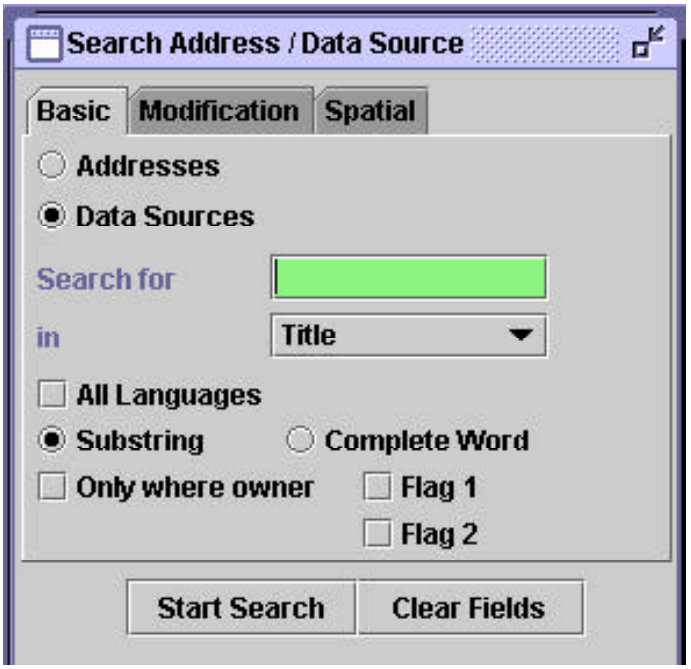


Figure 17: Search Window (Basic)

- *Modification* to enter time intervals for the date of creation and the date of the last update of a data set (Metadata Record).
- *Spatial* to enable spatial restriction of the search by entering *NUTS Codes* (disabled for Address Search)

Search results are displayed in the R*esult List* which is an extension to the S*earch Window.* By clicking on an entry of the *result list*, modification or deletion of the data set is possible, if you are an authorised user (see figure 18).

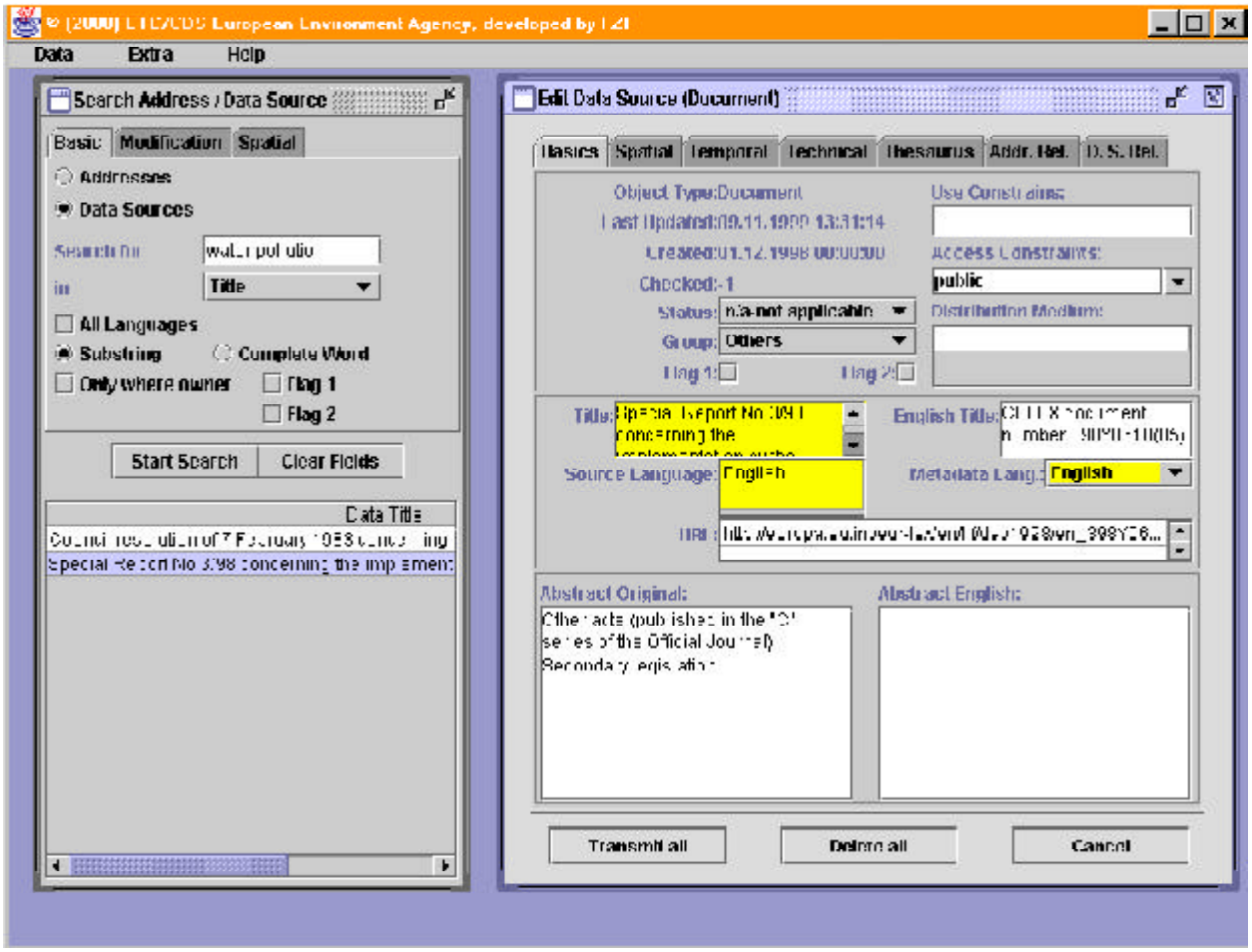


Figure 18: Result List and Update Window

4.4.2. Extra Menu

The **EXTRA** menu contains four items:

- **New Login...**,: change the current user
- **Options...:,** switch between supported languages or change the password
- **User Administration...**: create new users (access for *user_admin* only)
- **RefreshNUTSCodes**...: load new pre-defined location tables when connecting to a new database
- **Help**

Before working with WebCDS UpdateModule, graphical elements for the user interface have to be implemented in Java. WebCDS UpdateModule is configured by using `ResourceBundle` which is used in Java to specify information on language dependent configuration. Also, property files are used. There are several property files that configure the GUI and language dependent text strings used by the graphical elements. The files can be changed without compiling the Java code again. After changing anything in the property files, the application has to be restarted.

By writing new property files a new language can be installed easily.

Changes to property files should be made by administrators only, since unauthorised manipulation could cause severe problems.

5. Annex: Datamodel Description

Table Name	Field Name	Description
AccessConstrains		contains the entries for the access constraints pick list
	dat_access	unique identifier for the access constraint
	acc_constrain	Name of the access constraint to be selected from the Data form
	acc_sequence	sequence for the entries in the picklist
	Old16	identifier for the access constraint name in CDS 1.6
AddressCore		contains address information of the CDS core datamodell
	adr_id	Unique Identification of Address; generated
	adr_type	Type of Address (Institutions etc =2, Persons = 1); mandatory; coded
	adr_name	Name of institution or person; manadatory
	adr_ps_form	Title of addressee (Mr, Mrs, Miss, Doctor); optional
	adr_ps_title	Job title of addressee; optional
	adr_ps_first_name-	Given name or nickname (John, Mike); optional
	adr_tel	Telephone number; conditionally mandatory
	adr_fax	Telefax number; conditionally mandatory
	adr_email	E-Mail address; conditionally mandatory
	adr_url	URL address; conditionally mandatory
	adr_cc	Country code; mandatory; picklist
	adr_ml_zip	Postcode; conditionally mandatory
	adr_ml_street	Name of street; conditionally mandatory
	adr_ml_city	Name of village; conditionally mandatory; picklist form database
	adr_pb_zip	Postbox: postcode; conditionally mandatory
	adr_pb	Postbox: number; conditionally mandatory
	adr_date	Date of creation or last revision of Address; generated; manadatory
	adr_creation_date	Date of creation of Address; generated; mandatory
	adr_id_orig	Id of original record
	adr_valid	Yes if all mandatory fields are filled
	adr_has_parent	Performance enhencement: Has Parent = 1..., No Parent = 0; generated
	adr_mp_flag	flag for export and search conditions
AddressLanguage		languages of addressee
	adr_id	Unique Identification of Address; generated
	adr_language	prefered languages; mandatory; default
AddressLocal		local name/acronym of organisation
	adr_id	Unique Identification of Address; generated
	adr_language	selected languages; picklist; default
	adr_loc_name	local address name (different organisation names based on the selected language)
	adr_loc_acro	local address acronym (different organisation acronyms based on the selected language)
AddressType		pick list for the address type selection (organisation, person)
	adr_type	Type number of Address (Organisations etc =2, Persons = 1)
	adt_name	Type description
	adt_sequence	sequence for the entries in the picklist
AdrDatRelation		reference to data sources
	adr_id	Unique Identification of Address; generated
	dat_id	Unique Identification of Data Source; generated
	adt_type	Function or Type of Relation; mandatory
AdrDatRelationType		pick list of reference types
	adt_type	unique identifier for the relation type
	adt_text	Name of the relation type to be selected from the Address or Data form
	adt_sequence	sequence for the entries in the picklist
	Old16	identifier for the relation type in CDS Version 1.6
AdrHasChildren		relation between addresses and they children
	adr_id	Unique Identification of Address
	adr_has_children	Unique Identification of the child Address
AdrRel		reference to addresses (parent-child relation)
	adr_parent_id	Unique Identification of Parent Address; generated
	adr_id	Unique Identification of Address; generated
	adr_name	Name of Parent Address; redundant
	adr_parent_name	Name of Address; redundant
AdrThesRel		reference to thesaurus descriptors
	th_thes_no	No of term list or Thesaurus (see table: ThesThes); generated
	th_lang_no	No of language (see table: Language); generated
	th_desc_no	No of descriptor; generated
	th_no	Compiled internal hash-codeing
	adr_id	Unique Identification of Address; generated
DataClass		pick list for the data class selection
	dat_class	Class of Data Source; mandatory; coded
	dtt_name	Description

	dtt_dialog_box	Name of the extension form which will be opened by clicking the next button on the form Data
	dtt_sequence	sequence for the entries in the picklist
	Old16	identifier for the data class in CDS Version 1.6
DataCore	contains data source information of the CDS core datamodell	
	dat_id	Unique Identification of Data Source; generated
	dat_title	Title of Data Source; mandatory
	dat_title_engl	English title of Data Source; optional
	dat_abstract	Abstract; optional
	dat_abstract_engl	English Abstract, optional
	dat_ordering	Ordering information; optional
	dat_access	Accessibility of data, e.g. public, for offical use only, not available; optional
	dat_use	Usage restrictions; optional
	dat_lg_meta	Language of meta information; mandatory; default; picklist
	dat_date	Date of last revision of Data Source; generated; mandatory
	dat_creation_date	Date of creation of Data Source; generated; mandatory
	dat_class	Class of Data Source; mandatory; coded
	dat_id_orig	Id of Origin
	dat_valid	Yes if all mandatory fields are filled
	dat_has_parent	Perfomence enhencement: Has Parent = 1..., No Parent = 0; generated
	dat_date_source	Date of creation/modification of the resource (no locator); mandatory
	dat_sel_criteria	Indicates if the locator has to be exported (i.e. if it fulfills special conditions for export)
	dat_mp_flag	flag for export and search conditions
DataDistribution	Formats in which the data source is available	
	dat_id	Unique Identification of Data Source; generated
	dat_distrib	Distribution medium (paper, online); optional
	DataDobris	contains the data source information for the requirements of the Dobris + 3 report
	dat_id	Unique Identification of Data Source; generated
	Data_source	Data Source description
	Definitions	Definitions
	Remarks	Remarks
	Geo_coverage	Geographical coverage
	Geo_detail	Geographical level of detail
	Time_series	Time series
	Units	Units
	Presentation	Probable presentation
	Problems	Aggregation problems
	Target	Target/projections/scenario
	Compilation	Data compilation
	Contact	Contact
	Action	Action required
	OLE	Embedded OLE object
DataExt	contains data source information of the level 1 extension	
	dat_id	Unique Identification of Data Source; generated
	ext_subclass	Name of the group; Subclass Information (1.7-)
	ext_notes	Special Notes and additional information on Data Source; optional
	ext_status	State, e.g. planned, closed, in progress, n/a; optional; piclist
	su_descr	General description of technical coverage; regular
	su_sta_type	Type of Station (1.7-)
	su_sta_equip	Equipment of Station (1.7-)
	su_prod_usage	Scope of Tool, e.g. Statistical calculations, test and regression analysis; regular (-1.6 purp; 1.7-)
	su_proj_type	Type of project(1.7-)
	su_map_data	Type of datacollection underlying the map; regular
	su_map_type	Type of map, e.g. topographic or thematic; mandatory; picklist
	su_map_gis	GIS-System; (1.7-)
	su_map_res	Resolution of Map; (1.7-)
	su_map_res_unit	Unit of Resolution of Map, (dpi, l/mm); picklist
	su_map_coord	Coordinate system used for the map, e.g. UTM, Gauss-Krüger,...; regular; picklist (1.7-)
	su_doc_publisher	Publisher of Document (1.7-)
	su_doc_publ_place	Place of Publishing (1.7-)
	su_doc_year	Year of Publishing (1.7-)
	su_doc_isbn	ISBN/ISSN Number (1.7-)
	su_doc_source	Published in / Source (1.7-)
	su_doc_type	Type of Document (1.7-)
	lo_bb_auto	Automatically generated BB?; (1.7-)
	lo_bb_x_coord1	Coordinate of bounding box, lower left, x-coordinate; mandatory (if no dat_lo_id); (1.7-)
	lo_bb_y_coord1	Coordinate of bounding box, lower-left, y-coordinate; mandatory (if no dat_lo_id); (1.7-)
	lo_bb_z_coord1	Coordinate of bounding box, lower-left, z-coordinate; mandatory (if no dat_lo_id); (1.7-)

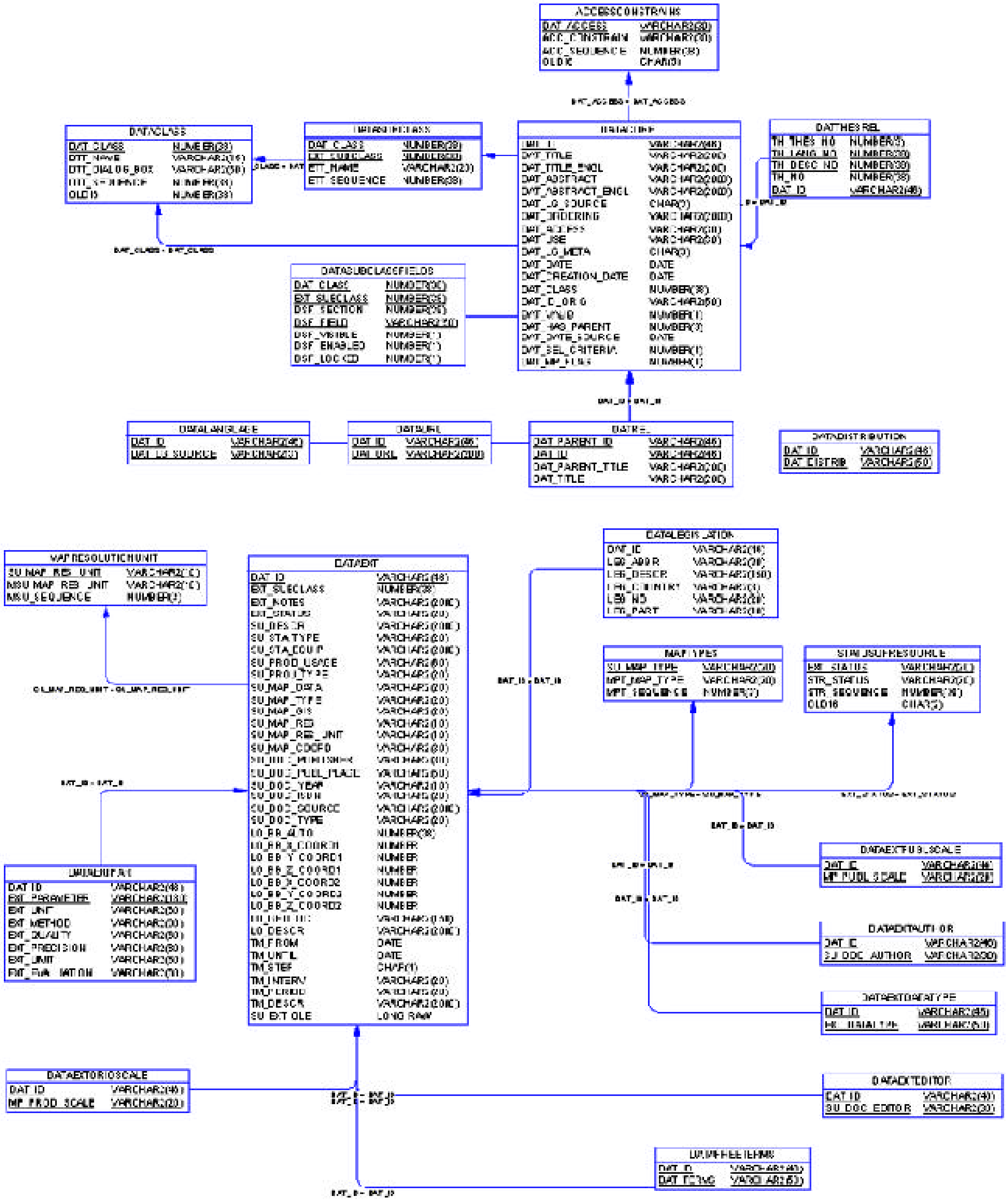
	lo_bb_x_coord2	Coordinate of bounding box, upper-right, x-coordinate; mandatory (if no dat_lo_id); (1.7-)
	lo_bb_y_coord2	Coordinate of bounding box, upper-right, y-coordinate; mandatory (if no dat_lo_id); (1.7-)
	lo_bb_z_coord2	Coordinate of bounding box, upper-right, z-coordinate; mandatory (if no dat_lo_id); (1.7-)
	lo_geoloc	Additional geographic identification; compatibility
	lo_descr	Additional free text description of spatial coverage; regular
	tm_from	Starting date; optional
	tm_until	Ending date; optional
	tm_step	Empirical Data: Time step (value) of update intervall (see tm_interv for unit), e.g. 5; optional
	tm_interv	Empirical Data: Type of update intervall, e.g. day, minute, hour, month, year; optional; picklist
	tm_period	Empirical Data: Indicates if the data collections if updated updated regularly, not regularly or never; optional; picklist
	tm_descr	General description of time coverage; regular
	su_ext_ole	Embedded OLE object
DataExtAuthor	list of all authors, subtable for the document class	
	dat_id	Unique Identification of Data Source; generated
	su_doc_author	Name of the Author (Data Class: Document)
DataExtDataType	data format subtable for the dataset class	
	dat_id	Unique Identification of Data Source; generated
	ext_datatype	Form of data, e.g. digital, analog, digital and anlog; regular; (1.7-)
DataExtEditor	editor subtable for the document class	
	dat_id	Unique Identification of Data Source; generated
	su_doc_editor	Name of the Editor (Data Class: Document)
DataExtLoc	reference to the location tables	
	dat_id	Unique Identification of Data Source; generated
	loc_code	location code (NUTS); mandatory
	loc_code_name	selected location
	loc_region	Region Name coded via Location0 table (determines the loc_code_name if loc_country is empty)
	loc_country	Country Name coded via Location1 table (determines the loc_code_name if loc_state is empty)
	loc_state	State Name coded via Location2 table (determines the loc_code_name if loc_county is empty)
	loc_county	County Name coded via Location3 table (determines the loc_code_name if loc_municipal is empty)
	loc_municipal	Municipal Name coded via Location4 table (determines the loc_code_name if not empty)
	dlc_add_code	additional, optional location code
DataExtOrigScale	original scale, subtable for the map class	
	dat_id	Unique Identification of Data Source; generated
	mp_prod_scale	Basic scale used in the production of the map; regular; (1.7-)
	DataExtPar	parameters associated with data source, subtable for datasets, maps and stations/sites
	dat_id	Unique Identification of Data Source; generated
	ext_parameter	Datasets, Maps: physical, chemical or biological quantity - Stations and Sites: Type of station;
	ext_unit	Datasets: Unit of measurements, e.g. m^3, days, µm; regular;
	ext_method	Datasets: Standards or Methods of data acquisition, e.g. gas chromatography, field investigation - Maps: Standards or Methods of data acquisition, e.g. satellite photography; regular;
	ext_quality	Datasets: Qualitiy ensuring Norms or Procedures, e.g. according to ISO 9000; regular; (-1.6)
	ext_precision	Datasets: Precision of measurements or calculations, e.g. 0.5-1mg; regular; (-1.6)
	ext_limit	Datasets: Detectable limit of substances measured according to the equipment used; optional; (-1.6)
	ext_evaluation	Dataset, Map: Description of the evaluation;optional; (-1.6)
DataExtPublScale	publication scale, subtable for the map class	
	dat_id	Unique Identification of Data Source; generated
	mp_publ_scale	Scale used for the publication of the map; regular;
DataFreeTerms	Descriptive terms not drawn from the thesaurus	
	dat_id	Unique Identification of Data Source; generated
	dat_distrib	Free Terms; optional
DataHasChildren	Relation between a data source and the children	
	dat_id	Unique Identification of Data Source
	dat_has_children	Unique Identification of Data Source Child
DataIndex	Performance optimising index *(not yet supported)*	
	idx_word	
	idx_dat_id	
	idx_dat_title	
DataLanguage	languages in which the resource is available	
	dat_id	Unique Identification of Data Source; generated

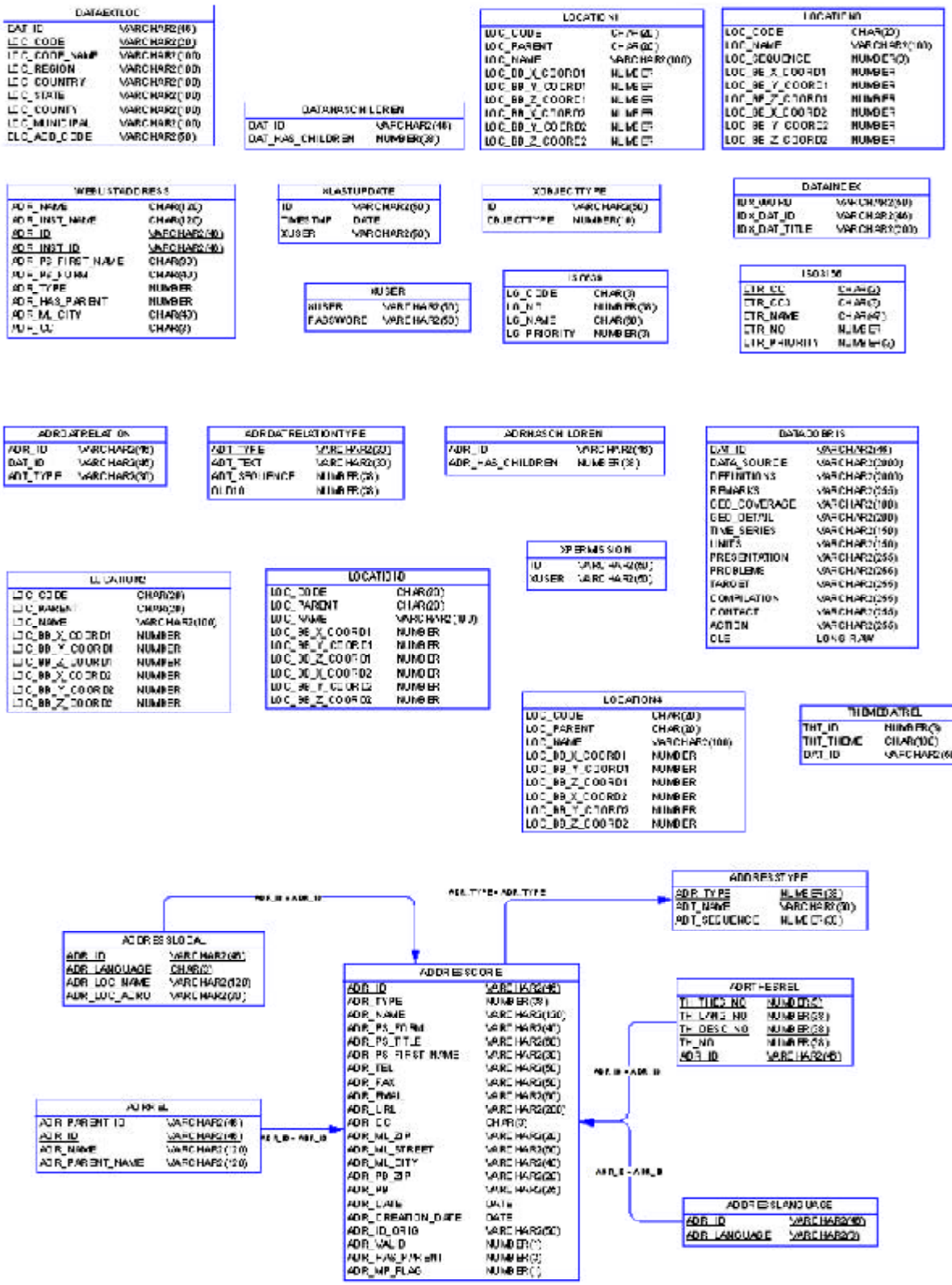
	dat_lg_source	Language of DataSource; mandatory; default; picklist
DataLegislation		legislation, the data source refers to or satisfies
	dat_id	Unique Identification of Data Source; generated
	leg_abbr	Abbreviation
	leg_descr	Name
	leg_country	Country of the Legislation; picklist
	leg_no	Official Number
	leg_part	Article number
DataSubClass		pick list for the group selection
	dat_class	Class identifier, where the subclasses belong to
	ext_subclass	identifier for the subclass/group
	ett_name	Name of the subclass
	ett_sequence	sequence for the entries in the picklist
DataSubClassFields		list of all visible fields for the corresponding subclass
	dat_class	Class identifier, where the subclasses belong to
	ext_subclass	identifier for the subclass/group
	dsf_section	identifier for the extension type (1 = Technical, 2 = Spatial, 3 = Temporal)
	dsf_field	Field name on the extension form
	dsf_visible	indicates if the field is visible for the affiliated subclass
	dsf_enabled	unused (indicates if the field is enabled for the affiliated subclass)
	dsf_locked	unused (indicates if the field is locked for the affiliated subclass)
DataUrl		urls associated with data source
	dat_id	Unique Identification of Data Source; generated
	dat_url	URL address; optional
DatRel		reference to data sources (parent-child relation)
	dat_parent_id	Unique Identification of Parent Data Source; generated
	dat_id	Unique Identification of Data Source; generated
	dat_parent_title	Title of Parent Data Source; redundant
	dat_title	Title of Data Source; redundant
DatThesRel		reference to thesaurus descriptors
	th_thes_no	No of term list or Thesaurus (see table: ThesThes); generated
	th_lang_no	No of language (see table: ThesLang); generated
	th_desc_no	No of descriptor (see table ThesDesc); generated
	th_no	unused (unique identifier for the descriptor)
	dat_id	Unique Identification of Data Source; generated
ISO3166		ISO 3166 entries (countries)
	ctr_cc	two letter abbreviation of the country
	ctr_cc3	three letter abbreviation of the country
	ctr_name	Countryname
	ctr_no	unique index of the country
	ctr_priority	indicates the sequence in the listboxes (where the countries are sorted by the priority)
ISO639		ISO 639 entries (languages)
	lg_code	three letter abbreviation of the language
	lg_no	unique index of the language
	lg_name	Languagename
	lg_priority	indicates the sequence in the listboxes (where the languages are sorted by the priority)
Location0		top level locations list
	loc_code	unique identifier for the region
	loc_sequence	sequence for the entries in the picklist
	loc_name	name of region; picklist
	loc_bb_x_coord1	x,y,z: minimum coordinates of the bounding box enclosing the region
	loc_bb_y_coord1	
	loc_bb_z_coord1	
	loc_bb_x_coord2	x,y,z: maximum coordinates of the bounding box enclosing the region
	loc_bb_y_coord2	
	loc_bb_z_coord2	
Location1		second level locations list (first nuts codes level)
	loc_code	unique identifier for the country
	loc_parent	identifier of the affiliated region (from table Location0)
	loc_name	name of country; picklist
	loc_bb_x_coord1	x,y,z: minimum coordinates of the bounding box enclosing the country
	loc_bb_y_coord1	
	loc_bb_z_coord1	
	loc_bb_x_coord2	x,y,z: maximum coordinates of the bounding box enclosing the country
	loc_bb_y_coord2	
	loc_bb_z_coord2	
Location2		third level locations list (second nuts codes level)
	loc_code	unique identifier for the state
	loc_parent	identifier of the affiliated country (from table Location1)
	loc_name	name of state, picklist
	loc_bb_x_coord1	x,y,z: minimum coordinates of the bounding box enclosing the state
	loc_bb_y_coord1	

	loc_bb_z_coord1	
	loc_bb_x_coord2	x,y,z: maximum coordinates of the bounding box enclosing the state
	loc_bb_y_coord2	
	loc_bb_z_coord2	
Location3	fourth level location list (third nuts codes level)	
	loc_code	unique identifier for the county
	loc_parent	identifier of the affiliated state (from table Location2)
	loc_name	name of county; picklist
	loc_bb_x_coord1	x,y,z: minimum coordinates of the bounding box enclosing the county
	loc_bb_y_coord1	
	loc_bb_z_coord1	
	loc_bb_x_coord2	x,y,z: maximum coordinates of the bounding box enclosing the county
	loc_bb_y_coord2	
	loc_bb_z_coord2	
Location4	fifth level location list	
	loc_code	unique identifier for the municipal
	loc_parent	identifier of the affiliated county (from table Location3)
	loc_name	name of municipal; picklist
	loc_bb_x_coord1	x,y,z: minimum coordinates of the bounding box enclosing the municipal
	loc_bb_y_coord1	
	loc_bb_z_coord1	
	loc_bb_x_coord2	x,y,z: maximum coordinates of the bounding box enclosing the municipal
	loc_bb_y_coord2	
	loc_bb_z_coord2	
	MapResolutionUnit	picklist with resolution units, subtable for GIS System and GIS Layer, groups of data class map
	su_map_res_unit	Unit of Resolution of Map, picklist; (1.7-)
	msu_map_res_unit	Unit of Resolution of Map, picklist; (1.7-)
	msu_sequence	sequence for the entries in the picklist
MapTypes	picklist with map types, subtable for GIS Systems and GIS Layers (groups of data class map)	
	su_map_type	Type of map underlying the GIS; regular
	mpt_map_type	Type of map underlying the GIS; regular
	mpt_sequence	sequence for the entries in the picklist
StatusOfResource	contains the entries for the status pick list	
	ext_status	unique identifier for the status
	str_status	Name of the status to be selected from the Data form
	str_sequence	sequence for the entries in the picklist
	OLD16	identifier for the status name in CDS Version 1.6
ThemeDatRel	relation between GEMET Themes and Data Sources	
	tht_id	unique identifier of the theme
	tht_theme	title of the theme
	dat_id	unique identifier of the data source
ThesDef	thesaurus definitions to corresponding descriptors	
	th_thes_no	Thesaurus number, coded via ThesThes table
	th_lang_no	Language number, coded via Language table
	th_desc_no	Descriptor number, unique number from descriptor ThesDesc
	th_no	unused (unique identifier for the descriptor composed of th_thes_no + th_lang_no + th_desc_no)
	definition	Definition Note
ThesDesc	thesaurus descriptors	
	th_thes_no	Thesaurus number, coded via ThesThes table
	th_lang_no	Language number, coded via Language table
	th_desc_no	Descriptor number, unique number for descriptor
	th_no	Hashcode
	th_type	1 = Descriptor; 2 = Used For; 3 = Synonym
	th_top_term	is 1 if no parent
	th_term	Descriptor
ThesDescPicked	temporary thesaurus terms picked by the user	
	th_thes_no	Thesaurus number, coded via ThesThes table
	th_lang_no	Language number, coded via Language table
	th_desc_no	Descriptor number, unique number from descriptor ThesDesc
ThesGrp	thesaurus descriptor to group reference	
	th_thes_no	Thesaurus number, coded via ThesThes table
	th_lang_no	Language number, coded via Language table
	th_desc_no	Descriptor number, unique number from descriptor ThesDesc
	th_no	unused (unique identifier for the descriptor composed of th_thes_no + th_lang_no + th_desc_no)
	ths_id	Thesaurus super group number
	thg_id	Thesaurus group number
ThesLang	thesaurus language table	
	th_thes_no	Thesaurus number, coded via ThesThes table
	th_lang_no	Language number, coded via Language table
ThesNar	thesaurus narrower and broader term reference	
	th_thes_no	Thesaurus number, coded via ThesThes table

	th_lang_no	Language number, coded via Language table
	th_desc_no	Descriptor number, unique number from descriptor ThesDesc
	th_no	unused (unique identifier for the descriptor composed of th_thes_no + th_lang_no + th_desc_no)
	th_nar_desc_no	Narrower Descriptor number, unique number from descriptor ThesDesc
	th_nar_no	unused (unique identifier for the descriptor composed of th_thes_no + th_lang_no + th_desc_no)
ThesOrigId	thesaurus compatibility table	
	th_thes_no	Thesaurus number, coded via ThesThes table
	th_lang_no	Language number, coded via Language table
	th_desc_no	Descriptor number, unique number from descriptor ThesDesc
	th_orig_thes_name	Name of Original Thesaurus
	th_orig_desc_no	Original Descriptor Number from different Thesaurus
ThesRel	thesaurus descriptor reference to related terms	
	th_thes_no	Thesaurus number, coded via ThesThes table
	th_lang_no	Language number, coded via Language table
	th_desc_no	Descriptor number, unique number from descriptor ThesDesc
	th_no	Unused (unique identifier for the descriptor composed of th_thes_no + th_lang_no + th_desc_no)
	th_rel_desc_no	related Descriptor number, unique number from descriptor
	th_rel_no	unused (unique identifier for the related term of th_thes_no + th_lang_no + th_rel_desc_no)
ThesSco	thesaurus scope notes to corresponding descriptors	
	th_thes_no	Thesaurus number, coded via ThesThes table
	th_lang_no	Language number, coded via Language table
	th_desc_no	Descriptor number, unique number from descriptor ThesDesc
	th_no	unused (unique identifier for the descriptor composed of th_thes_no + th_lang_no + th_desc_no)
	scope_note	Scope note
ThesSyn	thesaurus descriptor reference to synonyms	
	th_thes_no	Thesaurus number, coded via ThesThes table
	th_lang_no	Language number, coded via Language table
	th_desc_no	Descriptor number, unique number from descriptor ThesDesc
	th_no	unused (unique identifier for the related term composed of th_thes_no + th_lang_no + th_rel_desc_no)
	th_syn_desc_no	Synonym number, unique number from ThesDesc
	th_syn_no	unused (unique identifier for the synonym composed of th_thes_no + th_lang_no + th_syn_desc_no)
ThesTheme	thesaurus descriptor to theme reference	
	th_thes_no	Thesaurus number, coded via ThesThes table
	th_lang_no	Language number, coded via Language table
	th_desc_no	Descriptor number, unique number for descriptor
	th_no	unused (unique identifier for the descriptor composed of th_thes_no + th_lang_no + th_desc_no)
	tht_id	Theme number
ThesThes	list of thesauri	
	th_thes_no	Thesaurus number, coded via ThesThes table
	th_name	Name of Thesaurus
	th_url	URL or Thesaurus
	th_description	Description; future use
ThesTop	thesaurus descriptor reference to top terms	
	th_thes_no	Thesaurus number, coded via ThesThes table
	th_lang_no	Language number, coded via Language table
	th_desc_no	Descriptor number, unique number from descriptor ThesDesc
	th_no	unused (unique identifier for the descriptor composed of th_thes_no + th_lang_no + th_desc_no)
	th_top_desc_no	Description number, unique number from ThesDesc
	th_top_no	unused (unique identifier for the top term composed of th_thes_no + th_lang_no + th_top_desc_no)
ThesTypes	thesaurus type reference	
	th_type	index of the descriptor type
	th_name	name of the descriptor type
ThesUse	thesaurus descriptor reference to ”use termes”	
	th_thes_no	Thesaurus number, coded via ThesThes table
	th_lang_no	Language number, coded via Language table
	th_desc_no	Descriptor number, unique number from descriptor ThesDesc
	th_no	unused (unique identifier for the descriptor composed of th_thes_no + th_lang_no + th_desc_no)
	th_use_desc_no	used for Descriptor number, unique number from descriptor
	th_use_no	unused (unique identifier for the use-for-term composed of th_thes_no + th_lang_no + th_use_no)
ThRefGrp	thesaurus group description	
	th_thes_no	Thesaurus number, coded via ThesThes table
	th_lang_no	Language number, coded via Language table
	ths_id	Descriptor number, unique number from descriptor ThesDesc
	thg_id	Thesaurus group number

	thg_group_accro	Group acronym
	thg_group	Group
ThRefSGrp	thesaurus super group description	
	th_thes_no	Thesaurus number, coded via ThesThes table
	th_lang_no	Language number, coded via Language table
	ths_id	Descriptor number, unique number from descriptor ThesDesc
	ths_super_group_accro	- Super group acronym
	ths_super_group	Super Group
ThRefTheme	thesaurus themes description	
	th_thes_no	Thesaurus number, coded via ThesThes table
	th_lang_no	Language number, coded via Language table
	ths_id	Descriptor number, unique number from descriptor ThesDesc
	tht_theme_accro	Theme acronym
	tht_theme	Theme
TimeInterval	contains the entries for the units of the time interval picklist	
	tm_interv	Unit of the time interval; picklist
	tt_interv	Unit of the time interval; picklist
	tt_sequence	sequence for the entries in the picklist
TimePeriod	contains the entries for the update period pick list	
	tm_period	Period of data collection or measurement; picklist
	tp_period	Period of data collection or measurement; picklist
	tp_sequence	sequence for the entries in the picklist
WebListAddress	materialized view of addresscore and adrrel	
	adr_name	Name of institution or person
	adr_inst_name	Name of parent institution or person
	adr_id	Unique Identification of Address
	adr_inst_id	Unique Identification of parent of Address
	adr_ps_first_name	Given name or nickname (John, Mike); optional
	adr_ps_form	Title of addressee (Mr, Mrs, Miss, Doctor)
	adr_type	Type of Address (Institutions etc =2, Persons = 1); mandatory; coded
	adr_has_parent	Perfomence enhencement: Has Parent = 1..., No Parent = 0; generated
	adr_ml_city	Name of village; conditionally mandatory
	adr_cc	Country code; mandatory; picklist
XlastUpdate	Last update of an data source or address	
	id	unique identifier of the data source or address
	timestmp	time stamp, time of last update
	xuser	user name who did the last update
XobjectType	help table for the update module	
	id	unique identifier of an address or data sources
	objecttype	objecttype of an address of data source
Xpermission	access restrictions	
	id	unique identifier of an address or data sources
	xuser	user name having the permission to change the record
Xuser	basic authentication of users	
	xuser	user name
	password	password


ACCESSCONSTRAINTS
DATACLASS
DATASUBCLASS
DATACORE
DATTHESREL
DATASUBCLASSFIELDS
DATALANGUAGE
DATAURL
DATREL
DATADISTRIBUTION
MAPRESOLUTIONUNIT
DATAEXT
DATALEGISLATION
MAPTYPES
STATUSOFRESOURCE
DATAEXTPUBLSCALE
DATAEXTAUTHOR
DATAEXTDATATYPE
DATAEXTORIGSCALE
DATAEXTEDITOR
DATAFEETERMS


DATABASELOC
DAT_ID VARCHAR2(16)
LOC_CODE VARCHAR2(20)
LOC_COORD_NAME VARCHAR2(100)
LOC_REGION VARCHAR2(100)
LOC_COUNTRY VARCHAR2(100)
LOC_STATE VARCHAR2(100)
LOC_COUNTY VARCHAR2(100)
LOC_MUNICIPAL VARCHAR2(100)
LOC_ACID_CODE VARCHAR2(50)
DATABASCHILDREN
DAT_ID VARCHAR2(16)
DAT_HAS_CHILDREN NUMBER(38)
LOCATION1
LOC_CODE CHAR(20)
LOC_PARENT CHAR(20)
LOC_NAME VARCHAR2(100)
LOC_BB_X_COORD1 NUMBER
LOC_BB_Y_COORD1 NUMBER
LOC_BB_Z_COORD1 NUMBER
LOC_BB_X_COORD2 NUMBER
LOC_BB_Y_COORD2 NUMBER
LOC_BB_Z_COORD2 NUMBER
LOCATION2
LOC_CODE CHAR(20)
LOC_NAME VARCHAR2(100)
LOC_SEQUENCE NUMBER(20)
LOC_BB_X_COORD1 NUMBER
LOC_BB_Y_COORD1 NUMBER
LOC_BB_Z_COORD1 NUMBER
LOC_BB_X_COORD2 NUMBER
LOC_BB_Y_COORD2 NUMBER
LOC_BB_Z_COORD2 NUMBER
WEBUSTADDRESS
ADR_NAME CHAR(100)
ADR_INST_NAME CHAR(100)
ADR_ID VARCHAR2(40)
ADR_INST_ID VARCHAR2(40)
ADR_PS_FIRST_NAME CHAR(30)
ADR_PS_LAST_NAME CHAR(30)
ADR_TYPE NUMBER
ADR_HAS_PARENT NUMBER
ADR_ML_CITY CHAR(40)
ADR_LC CHAR(2)
XLASTUPDATE
ID VARCHAR2(50)
TIMESTAMP DATE
XUSER VARCHAR2(50)
XOBJECTTYPE
ID VARCHAR2(50)
OBJECTTYPE NUMBER(10)
DATAINDEX
IDX_UNIQUID VARCHAR2(50)
IDX_DAT_ID VARCHAR2(16)
IDX_DAT_TITLE VARCHAR2(200)
XUSER
USERNAME VARCHAR2(10)
PASSWORD VARCHAR2(50)
LOGOS
LO_CODE CHAR(3)
LO_NO NUMBER(38)
LO_NAME CHAR(50)
LO_PRIORITY NUMBER(3)
ISO3166
CTR_CC CHAR(2)
CTR_CC3 CHAR(3)
CTR_NAME CHAR(40)
CTR_NO NUMBER
CTR_PHONE NUMBER(3)
ADRDATRELATION
ADR_ID VARCHAR2(16)
DAT_ID VARCHAR2(16)
ADT_TYPE VARCHAR2(10)
ADRDATRELATIONTYPE
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ADT_TEXT VARCHAR2(30)
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ID_010 NUMBER(38)
ADRHASCHILDREN
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DATACOBRIS
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DATA_SOURCE VARCHAR2(2000)
DEFINITIONS VARCHAR2(2000)
REMARKS VARCHAR2(255)
GEO_COVERAGE VARCHAR2(100)
GEO_DETAIL VARCHAR2(200)
TIME_SERIES VARCHAR2(150)
UNITS VARCHAR2(150)
PRESENTATION VARCHAR2(255)
PROBLEMS VARCHAR2(255)
FAROUT VARCHAR2(255)
COMPILATION VARCHAR2(255)
CONTACT VARCHAR2(255)
ACTION VARCHAR2(255)
CLS LONG RAW
XPERMISSION
ID VARCHAR2(50)
XUSER VARCHAR2(50)
LOCATION3
LOC_CODE CHAR(20)
LOC_PARENT CHAR(20)
LOC_NAME VARCHAR2(100)
LOC_BB_X_COORD1 NUMBER
LOC_BB_Y_COORD1 NUMBER
LOC_BB_Z_COORD1 NUMBER
LOC_BB_X_COORD2 NUMBER
LOC_BB_Y_COORD2 NUMBER
LOC_BB_Z_COORD2 NUMBER
LOCATION4
LOC_CODE CHAR(20)
LOC_PARENT CHAR(20)
LOC_NAME VARCHAR2(100)
LOC_BB_X_COORD1 NUMBER
LOC_BB_Y_COORD1 NUMBER
LOC_BB_Z_COORD1 NUMBER
LOC_BB_X_COORD2 NUMBER
LOC_BB_Y_COORD2 NUMBER
LOC_BB_Z_COORD2 NUMBER
THEMEDATREL
THT_ID NUMBER(9
THT_THEME CHAR(10C)
DAT_ID VARCHAR2(16)
ADDRESSTYPE
ADR_TYPE NUMBER(38)
ADT_NAME VARCHAR2(30)
ADT_SEQUENCE NUMBER(10)
ADDRESSLOCAL
ADR_ID VARCHAR2(40)
ADR_LANGUAGE CHAR(2)
ADR_LOC_NAME VARCHAR2(120)
ADR_LOC_ALIAS VARCHAR2(20)
ADDRESSCORE
ADR_ID VARCHAR2(40)
ADR_TYPE NUMBER(38)
ADR_NAME VARCHAR2(120)
ADR_PS_TITLE VARCHAR2(40)
ADR_PS_TITLE VARCHAR2(30)
ADR_PS_FIRST_NAME VARCHAR2(30)
ADR_TEL VARCHAR2(50)
ADR_FAX VARCHAR2(50)
ADR_EMAIL VARCHAR2(100)
ADR_URL VARCHAR2(200)
ADR_CC CHAR(2)
ADR_ML_ZIP VARCHAR2(10)
ADR_ML_STREET VARCHAR2(100)
ADR_ML_CITY VARCHAR2(40)
ADR_PO_ZIP VARCHAR2(20)
ADR_PO_BOX VARCHAR2(20)
ADR_LANG DATE
ADR_CREATION_DATE DATE
ADR_ID_ORIG VARCHAR2(50)
ADR_VALID NUMBER(1)
ADR_HAS_PARENT NUMBER(1)
ADR_MP_FLAG NUMBER(1)
ADRTHESREL
TH_THES_NO NUMBER(5)
TH_LANG_NO NUMBER(38)
TH_DESC_NO NUMBER(38)
TH_NO NUMBER(38)
ADR_ID VARCHAR2(40)
ADRPARENT
ADR_PARENT_ID VARCHAR2(40)
ADR_ID VARCHAR2(40)
ADR_NAME VARCHAR2(120)
ADR_PARENT_NAME VARCHAR2(120)
ADDRESSLANGUAGE
ADR_ID VARCHAR2(40)
ADR_LANGUAGE VARCHAR2(2)