



IUFRO

# GLOBAL FOREST INFORMATION SERVICE GFIS

## GFIS Node User and Installation Manual

Version 1.0

- Draft -

by  
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# 1 Who should read this manual

On the one hand this manual is meant for all persons who are generally interested in the web based functionality of the Global Forest Information Service (GFIS) and on the other hand it's a guideline for all IT experts and web administrators who are in charge with the installation of a new GFIS Node.

If you plan to establish a new GFIS Node you should be able to configure the internet service on your web server, you should have an idea on how web pages generally work and you should understand the basic principals of managing a database.

Since the GFIS system architecture is database driven you can easily configure the GFIS Node by doing the necessary settings in a database without understanding the implemented program codes and scripts. If you are interested in technical details about the programming code of the GFIS software and the system architecture please refer to the paper *System Architecture and Technical Specification of a GFIS Node* (Sini and Weidenbach 2001).

## **2 What is the Global Forest Information Service (GFIS)**

### **2.1 History and future**

#### **2.1.1 Background**

The volume of globally generated forestry information is enormous, and the number of sources of information is equally overwhelming. Increasingly, such information is published using electronic means, but a substantial part of it remains inaccessible to users. The major problem facing information seekers world wide is the location of information sources corresponding to their needs. Equally important, information providers often do not easily find appropriate for a for presenting their information, which then remains inaccessible to others.

To help address these problems, the International Union of Forest Research Organisations (IUFRO) established the Global Forest Information Service (GFIS) Task Force in the autumn of 1998, led by Risto Päivinen of the European Forest Institute (EFI). The mission of the Task Force is to “develop a strategy for, and implement, an Internet-based metadata service, that will provide co-ordinated world wide access to forest information”.

The resulting service will provide multiple benefits to information users and providers including, facilitating user-friendly access to a greater amount of information, and improving the dissemination and quality of forest-related data and information. (IUFRO Secretariat 2000, Päivinen and Schuck 1999).

#### **2.1.2 The development of the GFIS prototypes**

The initial technical realisation of GFIS took part at the Joint Research Centre (JRC) of the European Commission in Ispra, Italy. Until December 2000 a first prototype was running there. With the leave of the responsible IT experts the server was closed down and re-installed at the Technical University of Vienna under the administration of the IUFRO secretariat (<http://iufro.ifs.tuwien.ac.at/gfis/index.php>).

The first remotely located node of the GFIS server at the JRC was located at the CAB International in Oxford. Meanwhile a few other nodes has been added to the GFIS server in Vienna, like the one at the WCMC in Cambridge or the “training node” at the FAO in Rome.

Thanks to the JAFER toolkit (see chapter 4.1.5) some other libraries at the universities in Oxford and Zurich could be made accessible via the Z39.50 (see Glossary) protocol.

Since October 2000 the Forestry Department of the FAO in Rome is actively driving the technical development of GFIS by the engagement of

an informatician, responsible for the implementation of 5 GFIS nodes in Africa (see chapter 2.1.4).

This major task requires (a) a permanent fine-tuning of the GFIS prototype to face the technical situation at the selected institutions in Africa and (b) an intensive training of the prospective GFIS node administrators in installing and maintaining the system. In order to create the best developing and training environment an additional GFIS node has been installed on the server of the FAO but the node is presently not visible outside the FAO computer network.

### **2.1.3 EFIS - a European Node of the GFIS**

Parallel to the on-going GFIS activities, the European Forest Institute (EFI) is co-ordinating a research project initiated by the JRC in Italy to contribute to the European Forest Information and Communication System (EFICS).

The establishment of the EFICS Regulation (established in 1989 by Council Regulation EEC No.1615/89) was a response to attempt to fulfil the increasing need to co-ordinate forest information among the Member States of the EU. Hence, the objective of the EFICS is to 'collect, co-ordinate, standardise, process and disseminate information concerning the forestry sector and its development'.

Consequently the main objective of the above mentioned research project is to build a fully operational prototype of a reliable European Forest Information System (EFIS) – which is to compile, process, analyse and disseminate available forestry information of various heterogeneous data sources on an international, national and regional level. Furthermore the principles of EFIS will follow the activities of the IUFRO Global Forest Information Service (GFIS) Taskforce why EFIS can be seen as a future European GFIS node.

The project is funded for 14 month and started in February 2001, the consortium consists of EFI in Finland, UNEP World Conservation Monitoring Centre in England (UNEP-WCMC), the Dresden University of Technology in Germany and the German National Research Centre for Information Technology (GMD).

### **2.1.4 GFIS Africa**

With the approval of the 3 year project by the European Commission DG VIII "Mobilizing scientific information on forests to promote their sustainable management in ACP countries" (ACP countries = African countries that are signatories to the Lomé Convention) the establishment of five nodes within Africa began. These nodes will facilitate access to and dissemination of scientific and technical information on forests and their utilization. The location of these nodes are Western Africa (Ghana and

Senegal), Eastern Africa (Kenya), Southern Africa (Zimbabwe), and Central Africa (Gabon). GFIS and its regional nodes will be a valuable information resource for decision-makers in tropical forest countries, and others. In particular it will provide forest information and generating integrated information products (Szaro et al. 2000).

The use of the World Wide Web is rapidly increasing in the developing countries, and GFIS will give agencies in those countries an opportunity to use information that has up to now only been accessible through inter-library loans or after long searches through foreign institutional facilities. One staff member is located at FAO in Rome to develop the interfaces for GFIS-AFRICA with the support of external consultants and to set up the needed equipment and training. Each node will be provided equipment, training for an information specialist and operational costs for each of the five nodes (Szaro et al. 2000).

As the project is implemented many new partners will be included to help develop the network. The objectives are: (1) to improve access to reliable scientifically based information on forests in ACP countries and their utilisation, (2) to build capacity in selected regional research institutions to develop and manage internet-based systems to facilitate broad access to research information on forests in the ACP countries, (3) to share experience and good practice in information management between ACP countries, and (4) to enhance integration and comparability between national data on forests throughout the ACP countries (Szaro et al. 2000).

### **2.1.5 Future perspectives of the GFIS**

The ambition of the GFIS is to have regional GFIS Information Servers (like the first one in Vienna) in every continent or geographic region. So there shall be at least one GFIS IS in Africa, in Europe, in Asia and Latin America. Every regional GFIS IS is providing links to multiple GFIS Nodes within its geographical responsibility. Between the regional GFIS IS a daily replication of the GFIS IS databases is foreseen in order to avoid data redundancies. So, within a short delay of one day, all registered user will find their specific user profile and the submitted forestry information on all GFIS IS worldwide.

## **2.2 The GFIS community**

### **2.2.1 People and Organisations**

As of June 2000, the members of the IUFRO GFIS Task Force and Sub-groups are:

- *Awang, Kamis*, Putra University, Malaysia
- *Cobbinah, Joseph*, Forestry Research Institute of Ghana
- *Hailu, Michael*, Deputy Coordinator, Centre for International Forestry Research
- *Ibrahim, Mohamed*, University of Greenwich
- *Kanninen, Markku*, Centro Agronómico Tropical de Investigación y Enseñanza
- *Landis, Eric*, Harry Reid Environmental Center
- *Langor, David*, IUFRO Special Programme for Developing Countries
- *Martin, Michael*, Food and Agriculture Organization of the UN
- *Mayhew, John*, World Conservation Monitoring Centre
- *Mills, Roger*, University of Oxford
- *Päivinen, Risto*, Coordinator, European Forest Institute
- *Petrokofsky, Gillian*, CAB International
- *Richards, Tim*, World Conservation Monitoring Centre
- *Saarikko, Jarmo*, Secretary, Webmaster, Finnish Forest Research Institute
- *Schaitza, Erich*, Empresa Brasileira de Pesquisas Agropecuária, Brazil
- *Smith, Brad*, United States Forest Service
- *Szaro, Robert*, IUFRO Special Programme for Developing Countries

Web links to the members' organisations can be found at:

<http://iufro.boku.ac.at/iufro/taskforce/tfgfis/litfgfis.htm>

### **2.2.2 Information about GFIS on the WWW**

The latest news on the activities of the IUFRO GFIS Task Force are published on the IUFRO web server at <http://iufro.boku.ac.at/iufro/taskforce/hptfgfis.htm>.

In order to better co-ordinate the activities of the GFIS Node administrators and system developers a mailing list and an internet page with restricted access (<http://iufro-gfis.intranets.com>) have been installed.

To subscribe the mailing list send an e-mail to [majordomo@metla.fi](mailto:majordomo@metla.fi), leave the subject field open and write *subscribe gfis-forum* in the message field.

### 2.2.3 List of existing GFIS Nodes and GFIS webmasters

As of May 2001 there are nodes in the below listed countries, which are managed by specifically trained webmasters. Their names and the URL address may change during the time, if this is the case please contact the corresponding institution to know the actual URL and the responsible webmaster's name.

| Country | Institution's Address  | URL of GFIS Node  | Web-master (as of May 2001) |
|---------|--|---|-----------------------------|
| Austria | IUFRO Secretariat, Vienna  | <a href="http://iufro.ifs.tuwien.ac.at/gfis/index.php">http://iufro.ifs.tuwien.ac.at/gfis/index.php</a> (GFIS IS)<br><a href="http://iufro.ifs.tuwien.ac.at/gfis/snodehome.php">http://iufro.ifs.tuwien.ac.at/gfis/snodehome.php</a> (Node) |                             |
| Italy   | Joint Research Centre, Space Applications Institute, Global Vegetation Monitoring Unit | <a href="http://www.trees.gvm.sai.jrc.it/fise/Examples/example3.ASP">http://www.trees.gvm.sai.jrc.it/fise/Examples/example3.ASP</a>   |                             |
| Italy   | FAO, Rome  | For internal use only   | Margherita Sini             |
| England | WCMC, Cambridge  |   |                             |
| England | CABI   | <a href="http://130.88.203.140/GFIS/example3.ASP">http://130.88.203.140/GFIS/example3.ASP</a>   |                             |
| Gabon   |  |   |                             |
| Senegal |  |   |                             |
| Ghana   |  |   |                             |
| Kenya   |  |   |                             |

Table 1: List of existing GFIS Nodes, their URL address and their webmasters.

## 3 How to use the GFIS system

### 3.1 Main features of the GFIS Information Server (GFIS IS)

To present the different user possibilities of the GFIS IS, the following brief explanations are illustrated with screenshots of the currently existing GFIS IS in Vienna.



Figure 1: The starting page of the GFIS Information Server at the IUFRO in Vienna

In principal the web interface of the GFIS mother web page (see Figure 1) provides 3 main services for the user:

1. The user can add general forestry information to the system and he can search for information that has been added by other users.
2. The user can search for pre-structured information about forestry data (metadata) stored in standardised databases of the GFIS Nodes world wide.
3. Auxiliary tools like the forestry calendar, the login and register procedure, hyperlinks to other forestry data providers and the provision of files needed to establish a new GFIS node complete the comprehensive service of the system.

### 3.1.1 The Login and Register procedure

In order to ensure data reliability and security, the access to the GFIS IS system is controlled by a registration and login routine. Once registered you can login with your password to use the GFIS. The login field is shown in Figure 1 on the upper right corner.

Before entering the system for the very first time you have to register yourself, select a login and password and give details about your person. This procedure is mainly implemented to avoid the input of anonymous and unreliable information into the system.

Whenever you enter forestry related information into the GFIS IS system, your personal information will be added to it. And whenever somebody is retrieving information from the system he/she will immediately see who entered the data and, if necessary, could easily get in touch with this person.

The screenshot shows a web browser window titled "GFIS-IUFRO Main Website - Microsoft Internet Explorer". The address bar shows "http://iufro.ifs.tuwien.ac.at/gfis/reg1home.php". The page header includes the GFIS logo, the text "GFIS-Global Forest Information Service", and a navigation menu with links for Home, Calendar, About Us, Help, and Logout. A left sidebar contains a list of menu items such as Home, IUFRO WEB SITE, GFIS Brochure, and IUFRO Abstracts. The main content area is titled "User Registration - Part 1 - Personal Data" and includes a form with the following fields:

- NAME**: name and surname (eg. Johnny Walker) with a red asterisk indicating it is a mandatory field.
- WEB SITE**: url (eg. http://www.myweb.net) with a red asterisk indicating it is a mandatory field.
- NOTES**: A text area for additional information.

Below the form are two buttons: "reset form" and "continue to the next page". A mouse cursor is visible over the "continue to the next page" button.

Figure 2: The registration interface part 1 of the GFIS IS web page in Vienna



Figure 3: The registration interface part 2 of the GFIS IS web page in Vienna

### 3.1.2 Adding and searching forestry related information

After entering the GFIS IS system you can either add or search for forestry related information. Please note that this functionality is limited to the GFIS Information Server, i.e. it is not implemented in the GFIS Nodes. The information is categorised into 6 objects (see Figure 4) and it will be exclusively stored in the GFIS IS.



Figure 4: User interface of the GFIS Vienna web page to select an object to be added to the system.

You can enter or search for:

1. an Organisation that is operating in a forestry related field
2. an Event like a forest scientific conference etc.
3. a Publication like scientific articles, manuals or books etc.
4. an Announcement, like personnel news, given awards etc.
5. a Protected Area, i.e. designated and legally protected natural areas
6. a Plantation, i.e. afforestations and commercial plantations

### 3.1.2.1 Adding information to the system

Every object has a specific form to be filled in. Figure 5 illustrates the input form for an event as used on the GFIS IS web page in Vienna:

The screenshot shows a web browser window titled "GFIS-IUFRO Main Website - Microsoft Internet Explorer". The address bar shows "http://iufro.fs.tuwien.ac.at/gfis/addeventhome.php". The page header includes the GFIS logo and the text "GFIS-Global Forest Information Service". A navigation bar contains links for "Home", "Calendar", "About Us", "Help", and "Logout".

The main content area is titled "Insert values for new Event" and contains the following form fields:

- Organisation:** A text input field with a red asterisk (\*\*).
- Name or Title:** A text input field with a red asterisk (\*\*).
- Description:** A large text area with a red asterisk (\*\*). A note below it states "Max length is 1000 characters (300 words)".
- URL:** A text input field with a red asterisk (\*\*).
- Location:** A dropdown menu with "NO COUNTRY" selected and a red asterisk (\*\*).
- Associated Keyword:** A dropdown menu with "No keyword" selected and a red asterisk (\*\*). Other options include "[FACTORS OF THE ENVIRONMENT, BIOLOGY]", "Animal ecology. Game and fish management, hunting, General", and "General biology".
- Language:** A dropdown menu with "No Language" selected and a red asterisk (\*\*). Other options include "Afar", "Abkhazian", "Achinese", and "Acoli".
- Event Objectives:** A text area at the bottom of the form.

A vertical navigation menu on the left side of the page lists various links such as "Home", "IUFRO WEB SITE", "GFIS Brochure", "Preliminary Request", "Local Advanced Search", "GFIS NODES Search", "Add Objects", "What's New", "Calendar", "Annual Calendar", "Edit Profile", "CURRENT GFIS NODE SOLUTION", "download GFIS Node Software", "OTHER GFIS NODE SOLUTIONS (to realize interoperability search)", "Jafer", "Multi Host Search", "The SOMLib Digital Library", "Experiments - IUFRO", and "Abstracts".

Figure 5: Input form to add an event

Following Figure 6 shows the input form for a plantation on the GFIS IS page in Vienna:

GFIS-IUFRO Main Website - Microsoft Internet Explorer  
 Address http://iufro.fs.tuwien.ac.at/gfis/addplanhome.php

**GFIS** **GFIS-Global Forest Information Service**

Home . Calendar . About Us . Logout

### Insert values for new Plantation

*\*\* mandatory fields*

**Protected Area**

Name or Title:  \*\*

Description:  \*\*  
*Max length is 1000 characters (300 words)*

URL:  \*\*

Location:  \*\*

Associated Keyword:  \*\*

Language:  \*\*

Size:

Starting Date:

Done Internet

Figure 6: Input form for a new plantation on the GFIS IS web page in Vienna.

### 3.1.2.2 Searching for information

All information that has been entered by the GFIS users can be queried using a simple text field for a *free text search* (see Figure 7) or a more detailed and *structured search form* (see Figure 8).

The free text search requires the use of logical operands like AND, OR, NOT to combine multiple search words. The structured search form corresponds to the input form shown in chapter 3.1.2.1 and allows a detailed search for different items (see Figure 8).

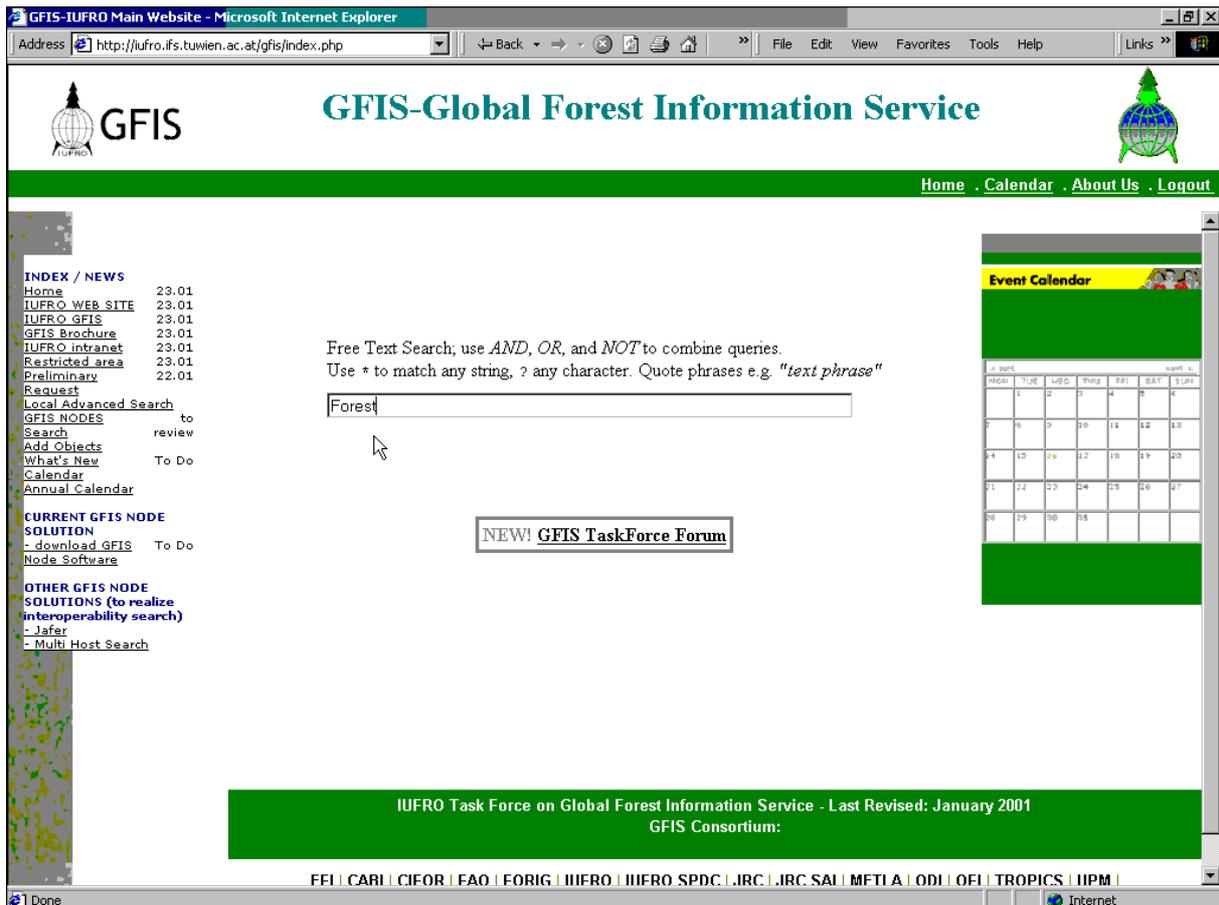


Figure 7: A text field on the index page of the GFIS IS web page in Vienna allows a free text search to retrieve information from the system.



Figure 8: The well structured interface used on the GFIS IS page in Vienna to query the system database for submitted objects.

### 3.1.2.3 Display of found information

The system will search the database using either the keywords you selected from the list or the keywords that you entered into the text field. The search results are presented in a table with a hyperlink to the users homepage (Figure 9) and a link to a more detailed page with the personal data of the user who submitted the information to the GFIS system (see Figure 10).



The screenshot shows a Microsoft Internet Explorer browser window displaying the GFIS-Global Forest Information Service website. The browser's address bar shows the URL: <http://iufro.ifs.tuwien.ac.at/gfis/nsearchresultshome.php>. The website header includes the GFIS logo and the title "GFIS-Global Forest Information Service". A navigation menu at the top right contains links for Home, Calendar, About Us, Help, and Logout. On the left side, there is a vertical menu with various options such as Home, IUFRO WEB SITE, IUFRO GFIS, GFIS Brochure, IUFRO intranet, Restricted area, Preliminary Request, Local Advanced Search, GFIS NODES Search, Add Objects, What's New, Calendar, Annual Calendar, Edit Profile, CURRENT GFIS NODE SOLUTION, download GFIS Node Software, OTHER GFIS NODE SOLUTIONS (to realize interoperability search), Jafer, Multi Host Search, The SOMLib Digital Library - Experiments - IUFRO Abstracts. The main content area displays the search results for "All 6 matching entries:". The first entry is "GFIS Africa Training Course,Event" with a description: "The GFIS Administrator training course objective is to train local people at the African Nodes to be GFIS web masters and database managers." The second entry is "GFIS Africa Training Course,Event" with a similar description. The third entry is "Diseases and Insects in Forest Nurseries - 4th Meeting of IUFRO Working Party 7.03.04,Event" with a detailed description of the technical programme committee and conference purpose. The fourth entry is "GFIS Africa training x web masters,Event" with a description of the training course. The fifth entry is "CRIS 2000 - Knowledge at work - research information for society,Event" with a description of internet technology and computer networks. The sixth entry is "Taller sobre la secuestación de carbono,Event" with a description: "comprender todo".

Figure 9: On the Vienna GFIS IS page the results of the search for an event are shown with a hyperlink to more details about it (see Figure 10).



Figure 10: A dynamically generated web page showing the information found in the GFIS IS database.

### 3.1.3 GFIS IS Auxiliary Tools

#### 3.1.3.1 Downloadable Files

One of the GFIS objectives is to increase the global access to forestry related data. According to the GFIS system architecture this goal can only be achieved if prospective data providers are using the same system standards, i.e. the GFIS scripts to do the query and the standardised databases used to

- a) define the location of the catalogues (locator database) and
- b) store the metadata of the forestry related resources

To facilitate the establishment of new GFIS Nodes a set of installation files can be downloaded from the GFIS IS web pages (see left column of Figure 1). Chapter 4.1.3 describes how to use the download files to install a new GFIS Node.

### 3.1.3.2 User Registration and Profile Control

As shown in Figure 3 every user has the possibility to submit his personal data to the system. The submitted information will be stored in a database and can be displayed on demand as shown in Figure 11.



The screenshot shows a web browser window displaying the GFIS-Global Forest Information Service website. The page title is "GFIS-Global Forest Information Service". The browser address bar shows "http://iufro.ifs.tuwien.ac.at/gfis/showmemberhome.php". The page content includes a navigation menu on the left with items like "Home", "GFIS Brochure", "Register", and "Multi Host Search". The main content area displays "Detail page for: Markus Weidenbach" with the following information:

- Event detail:**
  - Title: Markus Weidenbach (USR)
  - Description: Consultant for Geographic Information Management, Forestry and Land Use Planning
  - Created on: 02:25:26 14 Apr 2001
  - Submitted By: Markus Weidenbach
  - Url: <http://cypermap.com>
  - Location: ITALY
  - Language: English
  - Keyword: Land use, land use policy. Afforestation policy
- Login: mawe
- Page Size: 20

**CONTACT INFORMATION**

- Name: Markus Weidenbach
- Address: Via Galileo Galilei 32, 21020 Taino (VA), Italia
- Phone: 0039-0331-957431
- Fax: 0049-89-24432559
- E-mail: [weidenbach@fin.it](mailto:weidenbach@fin.it)
- Note:

**EDIT USER PROFILE**

Figure 11: Personal information is stored in a database and can be displayed on demand

At any time the user can change his personal co-ordinates by selecting the "Edit User Profile" interface (see Figure 12 and Figure 13).

Figure 12: First part of the form to edit the user profile

Figure 13: Second part of the form to edit the user profile

### 3.1.3.3 The GFIS Calendar

The calendar provides a commonly known format to get an overview on future forestry related events like a scientific congress, user meetings, training courses etc.. In fact the calendar is another interface to display the information submitted by the user (see chapter 3.1.2).

You can choose between an annual (Figure 14) and a monthly (Figure 15) calendar form.

The screenshot shows a web browser window displaying the GFIS website. The page title is "GFIS-IUFRO Main Website - Microsoft Internet Explorer". The address bar shows "http://iufro.ifs.tuwien.ac.at/gfis/acalendarhome.php". The website header includes the GFIS logo and the text "GFIS-Global Forest Information Service". A green navigation bar contains links for "Home", "Calendar", "About Us", and "Logout".

The main content area is titled "<-- 2000 Annual Calendar 2002 -->". On the left side, there is a navigation menu with links such as "INDEX / NEWS", "Home", "IUFRO WEB SITE", "GFIS Brochure", "IUFRO intranet", "Restricted area", "Preliminary", "Request", "Local Advanced Search", "GFIS NODES", "Search", "Add Objects", "What's New", "Calendar", "Annual Calendar", "CURRENT GFIS NODE SOLUTION", "download GFIS Node Software", "OTHER GFIS NODE SOLUTIONS (to realize interoperability search)", "Jafer", and "Multi Host Search".

The main content area lists "Events taking place in 2001":

- Monday 12th Mar 2001: 12 Mar 2001 to 06 Apr 2001 [GFIS Africa Training Course](#)
- Monday 12th Mar 2001: 12 Mar 2001 to 06 Apr 2001 [GFIS Africa Training Course](#)
- Monday 12th Mar 2001: 12 Mar 2001 to 06 Apr 2001 [GFIS Africa training x web masters](#)

Below the events, there is a heading "<-- 2000 January 2001 2002 -->" and a calendar grid for January 2001:

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|--------|--------|---------|-----------|----------|--------|----------|
|        | 1      | 2       | 3         | 4        | 5      | 6        |
| 7      | 8      | 9       | 10        | 11       | 12     | 13       |
| 14     | 15     | 16      | 17        | 18       | 19     | 20       |
| 21     | 22     | 23      | 24        | 25       | 26     | 27       |
| 28     | 29     | 30      | 31        |          |        |          |

Figure 14: The annual calendar at the GFIS web page in Vienna

The screenshot shows the GFIS website interface in Microsoft Internet Explorer. The browser's address bar displays the URL: <http://iufro.fs.tuwien.ac.at/gfis/ncalendarhome.php>. The page features the GFIS logo and the title "GFIS-Global Forest Information Service". A navigation bar includes links for Home, Calendar, About Us, and Logout.

The main content area displays a monthly calendar for April 2001. The calendar is a grid with columns for the days of the week (Sunday to Saturday) and rows for the days of the month (1 to 30). Below the calendar, there is a dropdown menu for the month (April) and the year (2001), along with a "View Calendar" button.

Underneath the calendar, the section "Events taking place in April 2001" lists several events with their dates and links to more information:

| Day                    | Event                      | Link   |
|------------------------|----------------------------|--|
| Monday 12th Mar 2001   | 12 Mar 2001 to 06 Apr 2001 | <a href="#">GFIS Africa Training Course</a>                                      |
| Monday 12th Mar 2001   | 12 Mar 2001 to 06 Apr 2001 | <a href="#">GFIS Africa Training Course</a>                                      |
| Monday 12th Mar 2001   | 12 Mar 2001 to 06 Apr 2001 | <a href="#">GFIS Africa training x web masters</a>                               |
| Saturday 08th Jan 2000 | 08 Jan 2000 to 21 Dec 2002 | <a href="#">CRIS 2000 - Knowledge at work - research information for society</a> |

The left sidebar contains a menu with categories like "INDEX / NEWS", "CURRENT GFIS NODE SOLUTION", and "OTHER GFIS NODE SOLUTIONS". The bottom of the browser window shows the address bar and the "Internet" icon.

Figure 15: The monthly calendar form at the Vienna GFIS page

### 3.1.3.4 See what's new

This function provides a very quick overview on the latest information that has been submitted to the system. Figure 16 shows the user interface used to enter the requested time period and to display the corresponding records found in the database. Again, the information includes a link to more details about the retrieved item as shown in Figure 10.

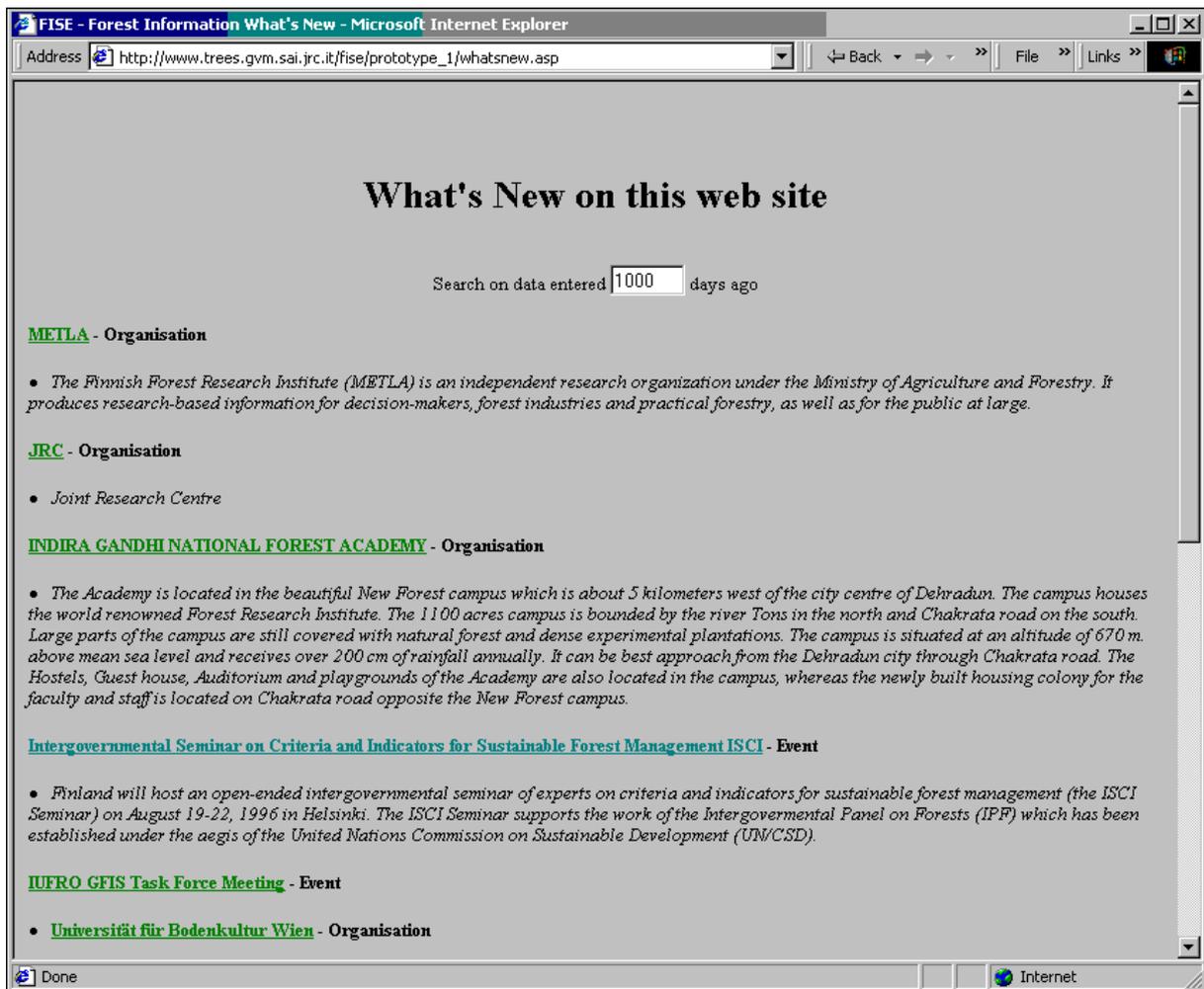


Figure 16: User interface of the GFIS page in Ispra to query and display the latest news submitted to the system.

### 3.1.3.5 Implemented hyperlinks to external information

Hyperlinks to external information are an important feature of the GFIS system. It is not represented by a separate interface but instead it's a steady service you can use all the time when an active hyperlink is presented, for instance when the details of requested results are displayed.

Additionally, the user can obtain information about the GFIS background and the on-going activities of the IUFRO Task Force who initiated the development of GFIS. This kind of information can be accessed e.g. by clicking the "About us" link or downloading the "GFIS Brochure" from the main GFIS page in Vienna (see Figure 1).

## **3.2 Querying the metadata catalogues of the GFIS Nodes**

To present the different possibilities to query the catalogues of the GFIS Nodes, the following explanations are illustrated with screenshots of the currently existing GFIS Nodes in Vienna, Rome and Ispra.

### **3.2.1 Metadata and databases used for the GFIS Nodes**

In order to structure the huge amount of globally available forestry data a system is needed that is able to describe all kind of forestry information, like maps, publications, software programs etc. The detailed description of data is called metadata. Making forestry related metadata available to potential users will also improve the communication between all stakeholders, like forestry data providers, forestry institutions and private and public data users. To support this process a standardised form of metadata is needed because it helps to facilitate the exchange of data and the search for specific products will become more efficient.

Presently, scientists are discussing the suitability of different standards on an international level. Existing preliminary standards are under permanent development like the one of the US American Federal Geographic Data Committee (FGDC), the ISO/TC211 standard or the Dublin Core elements which are seen as the most proposing possibility reach the objectives of the GFIS.

The Dublin Core is an international initiative coming from the library and publishing communities. It is based on consensus, it is entirely open and it is increasingly being looked at by a wide range of industries.

Basically the Dublin Core is a list of elements or table fields - like "Title", "Creator", "Subject", "Date" etc. – used to describe the content of forestry data.

In chapter 4.1.5 it is shown how the GFIS system is using the Dublin Core elements to store metadata. Following paragraphs describe how you can use the GFIS system to query distributed Dublin Core compatible metadatabases.

### **3.2.2 Querying the GFIS Node catalogues**

All GFIS Nodes - including the GFIS Node that is physically attached to the GFIS IS web page in Vienna - provide a list of several catalogues that can be addressed to search for forestry related metadata.

In order to start the query of the catalogues the user can either go to the GFIS IS web page in Vienna, where he can select all those Nodes and catalogues world wide he wants to query, or (b) he can go directly to the Node's own web page by using its URL address.

If you decide to start your search via the GFIS IS main page you have to click on GFIS NODES SEARCH on the index on the left side of the page. Then the GFIS Node interface will be opened (see Figure 17) with a

- A text field to enter your search key words. Pressing the “ENTER” key of your keyboard (or the “Search” button next to the text field, if available) will start a search for the keywords in those metadata catalogues belonging to all Nodes that were marked in the list above.
- A button or hyperlink with a “Search Locally” functionality. This button initiates the query on multiple fields (see Figure 18) of catalogues linked to the current Node, i.e. in this case of the GFIS IS Node in Vienna only.
- A button or hyperlink with a “Global Search” functionality. Pressing this button starts the query on multiple fields (see Figure 18) of catalogues belonging to all Nodes marked in the list above.

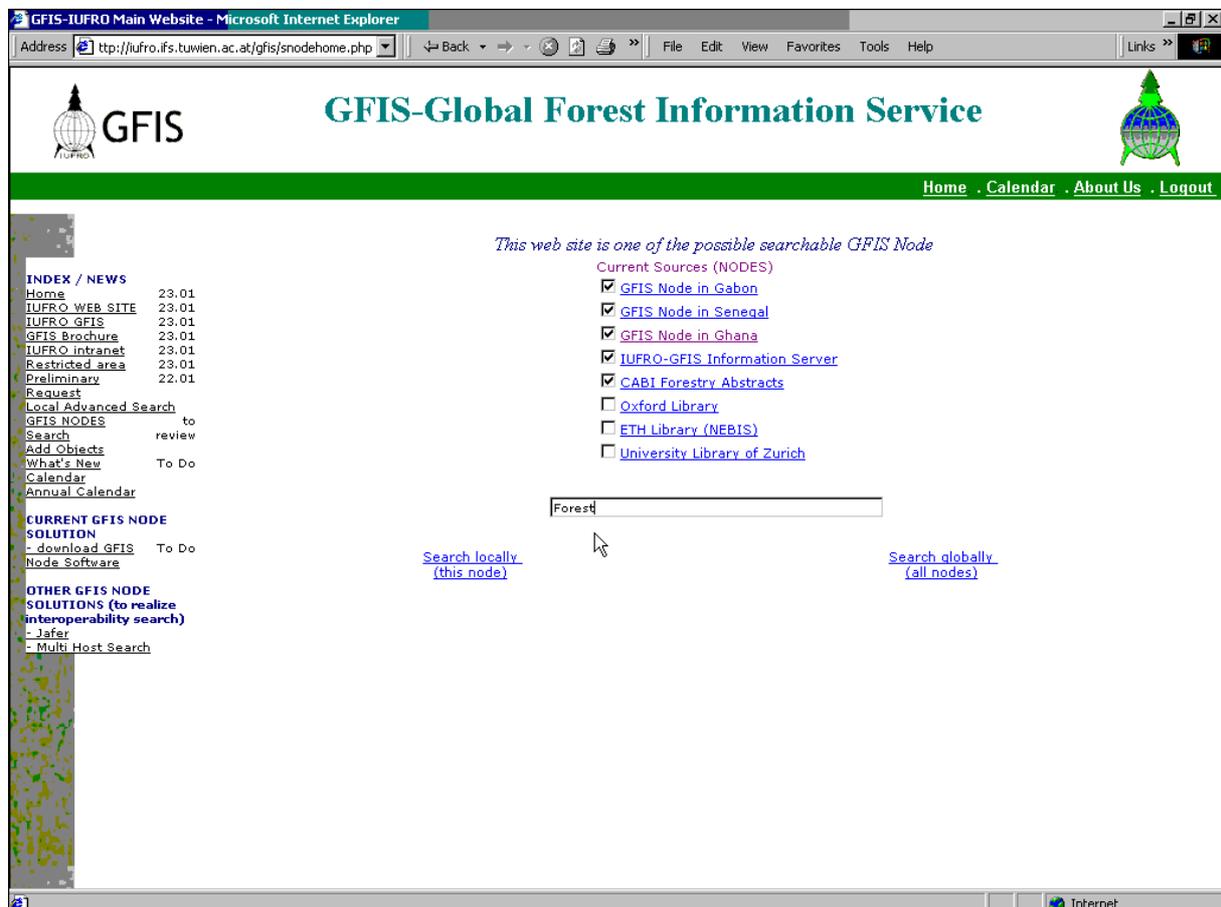


Figure 17: The main GFIS Node page in Vienna offers the possibility to search databases that are physically located on the servers in Vienna or on the servers of several GFIS Node Institutions all around the world. Use the text field to enter your keywords to query all rows and columns of the catalogues belonging to Nodes that are marked in the list above.

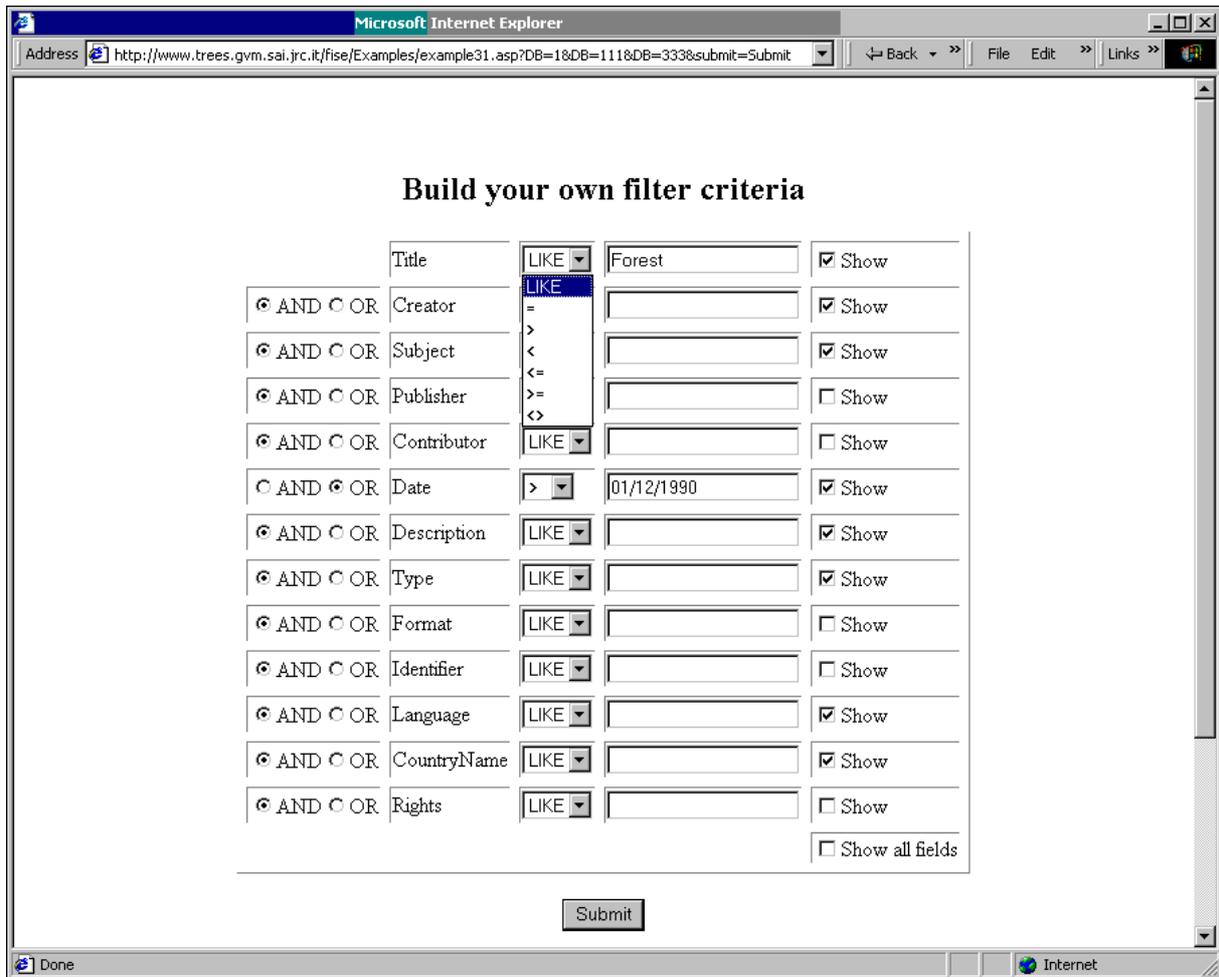


Figure 18: The page of the GFIS Node in Ispra presents a detailed query form to search for different Dublin Core fields (Title, Creator, Subject etc.) separately. The user can combine the fields with the logical operands AND and OR. Additionally he can define the content of the Dublin Core fields by selecting between LIKE (is like), = (is equal), > (is bigger than), < (is smaller than), >= (is equal or bigger than), <= (is equal or smaller than) and <> (is not equal). This query form also provides a button for every field to tell the system if the field will be shown or hidden when the search results are displayed.

### 3.2.3 Displaying the results found in the catalogues

Before presenting the detailed results of the search a dynamically generated page is informing the user about the amount of records found in every pre-selected database (see Figure 19).



The screenshot shows a web browser window displaying the GFIS website. The page title is "GFIS-Global Forest Information Service". The navigation menu includes "Home", "Calendar", "About Us", and "Logout". The main content area is titled "Results" and contains a table with the following data:

| Database Name                 | Status    | Action                      | Number of Items |
|-------------------------------|-----------|-----------------------------|-----------------|
| GFIS Node in Gabon            | Server On | <a href="#">Show Result</a> | 67              |
| GFIS Node in Senegal          | Server On | <a href="#">Show Result</a> | 25              |
| GFIS Node in Ghana            | Server On | <a href="#">Show Result</a> | 60              |
| IUFRO-GFIS Information Server | Server On | <a href="#">Show Result</a> | 37              |
| CABI Forestry Abstracts       | Server On | <a href="#">Show Result</a> | 7               |
| Oxford Library                | Server On | <a href="#">Show Result</a> | 28              |
| ETH Library (NEBIS)           | Server On | <a href="#">Show Result</a> | 19              |
| University Library of Zurich  | Server On | <a href="#">Show Result</a> | 87              |

The left sidebar contains a navigation menu with sections: "INDEX / NEWS", "CURRENT GFIS NODE SOLUTION", and "OTHER GFIS NODE SOLUTIONS (to realize interoperability search)".

Figure 19: Before showing the detailed results a dynamically generated page informs the user about the records found in every single pre-selected database.

By clicking on "Show Result", the user can select the database to be displayed.

Finally the detailed results will be presented in a table, showing all those fields that have been selected before by activating the "Show" button in the query form illustrated in Figure 20.

**Results for CABI Forestry Abstracts**

[Back to DB list](#) | [Back to query page](#) | [CABI CODES](#)

[Title] LIKE "%e%" OR [Date] > #01/12/1990#

**Records found: 1754**

Page: 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 | 129 | 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 | 141 | 142 | 143 | 144 | 145 | 146 | 147 | 148 | 149 | 150 | 151 | 152 | 153 | 154 | 155 | 156 | 157 | 158 | 159 | 160 | 161 | 162 | 163 | 164 | 165 | 166 | 167 | 168 | 169 | 170 | 171 | 172 | 173 | 174 | 175 | 176 |

| Title   | Creator  | Subject                                    | Date  | Description   | Type                        | Language | CountryName |
|---|--|--|-------|---|-----------------------------|----------|-------------|
| Sixty years of Metsanduslikud uunimusEd.                | Meikar, T \ Tanu, U.   | Forestry, Forest Products and Agroforestry | 1/199 | publications\journals\research\forestry\history\periodicals   | Electronic Abstract Journal | Estonian | Estonia     |
| JapanEs flowEring chErmEs.                              | Kuiter, W.   | Plants of Economic Importance              | 1/199 | ornamental woody plants\Prunus\books\cultural methods\taxonomy\botany\propagation   | Electronic Abstract Journal | English  | Japan       |
| MaplEs for gardErs: a color EncyclopEdia.               | Gelderen, C. J. van\ Gelderen, D. M. van                               | Forestry, Forest Products and Agroforestry | 1/199 | Acer\species\cultivars\hybrids\books\plant morphology\ornamental value\taxonomy\nomenclature\habit\leaves\flowers\fruits\geographical distribution\winter hardiness\landscaping   | Electronic Abstract Journal | English  |             |
| EdiblE wattlE sEEds of southErm Australia.              | Maslin, B. R.\ Thomson, L. A. J.\ McDonald, M. W.\ Hamilton-Brown, S.  | Forestry, Forest Products and Agroforestry | 1/199 | Australia\seeds\Acacia\Acacia victoriae\consumption\coppicing\growth studies\man\phenology\forest plantations\tripping\seed crops\seed production\semiarid zones\ruckering\taxonomy\utilization\wild foods\books\forest trees\multipurpose trees\edible species | Electronic Abstract Journal | English  | Australia   |
| Plant rEsourcEs of South, East Asia No.12(1). MEdicinal | Padua, L. S. del\ Bunyapraphatsara, N.\ Lemmens, R. H. M. J. (Editors) | Plants of Economic Importance              | 1/199 | books\medicinal plants\poisonous plants\South East Asia\plant composition\phytochemicals\biological activity\pharmacology\botany\plant ecology\cultural methods\harvesting\handling\processing\utilization\quality  | Electronic Abstract Journal | English  |             |

Figure 20: Results presented for one database, the columns to be displayed have been chosen in a previous step (see Figure 18).

## **4 Management of GFIS Nodes**

This chapter describes the measures and tasks needed to install, run and maintain a GFIS Node. Hence the following paragraphs mainly address those persons who are responsible for the set up and maintenance of the GFIS Nodes.

### **4.1 *Installation, configuration and maintenance of a GFIS Node***

#### **4.1.1 The GFIS Node Administrator**

Operating a GFIS Node needs an IT expert, who is able to maintain an internet server and who has basic skills in managing databases. The GFIS Node administrator will be the contact person for the IUFRO GFIS program co-ordinator in Vienna, that's why he has to understand the principles of the GFIS concept. Moreover his tasks comprise:

- a) the installation and updating of the GFIS Node software,
- b) the database driven configuration of the GFIS Node
- c) the setting up and maintenance of the linked catalogues with metadata

#### **4.1.2 Hard- and software requirements**

The minimal requirements to run a GFIS Node on your web server comprise an adequate hard- and software equipment. We propose following components:

##### *4.1.2.1 Hardware Specifications*

Basic requirements:

- To be defined ...

##### *4.1.2.2 Software Specifications*

Basic requirements:

- To do be defined ...

### 4.1.3 Three steps to install a GFIS Node

#### 4.1.3.1 Step 1: Download the GFIS Node Files

The first step is to download the necessary scripts and database files from the GFIS IS web page in Vienna (see Figure 1). All files you need are provided in a zipped archive called FISEASP.ZIP (contains ASP scripts), FISEPHP.ZIP (contains PHP scripts) or FISEJSP (contains JSP scripts). Select the scripts you prefer (note that ASP don't work on Unix/Linux without a specific asp supporting software and - vice versa - to run PHP on Windows you need a specific PHP script support). The ZIP archive contains following files:

| Name       | Format                                       | Purpose   |
|------------|--|---|
| Example3   | Script in asp, php, jsp                      | Script used to manage ODBC connection to locator database and metadata bases, offers selection of dbs to be queried.  |
| Example31  | Script in asp, php, jsp                      | Script presenting and controlling the query interface and the submittance to example32.asp  |
| Example32  | Script in asp, php, jsp                      | Script used to process the query and check the number of results found for every selected database  |
| Example33  | Script in asp, php, jsp                      | Script used to establish the database connection, query the database and display the found records in a table   |
| Checknrec  | Script in asp, php, jsp                      | Script used to check the number of results for every database   |
| FISE       | Database in MS Access format                 | Database to locate the metadatabases to be queried  |
| DublinCore | Template of a metadatabase for MS Access     | Template of an empty database with Dublin Core fields to be used to store the metadata of your forestry related information or data   |
| Build      | Script in asp, php, jsp                      | Script used to manage the ODBC connection with the mainDBRS.mdb database to control registration, login, submission of objects, <i>Provided only for regional GFIS mother web pages</i> |
| FISESearch | Script in asp, php, jsp                      | Script used to search forest information, i.e. objects added to the system. <i>Provided only for regional GFIS mother web pages</i>   |
| MainDBRS   | Template of a database with user information | Database with user information. <i>Provided only for regional GFIS mother web pages</i>   |

Table 2: Content of the ZIP archive to install a new GFIS Node

#### *4.1.3.2 Step 2: Define the GFIS Node directory*

Now you have to copy the code of the web pages and the locator database into a directory which is accessible through the internet. It is important to know, that this directory with the scripts and the locator database will be addressed when a query from a remote GFIS Node is launched to search your databases.

It is advisable to give the chosen directory a name or an URL alias which is compliant to other GFIS Nodes. We propose "GFIS\_NODE". If you map this directory name or the alias to the root of your internet server all requests on your databases will be addressed to `http://yourdomain/GFIS_NODE`.

#### *4.1.3.3 Step 3: Configure the locator database*

The next step to do is to tell the system where the Dublin Core compatible catalogues you want to query are located (the way how you set up these metadatabases is shown in chapter 4.1.5) and which database type you are using. In order to successfully link the databases to the system you have to change some fields in the locator database. The locator database is a crucial component of the GFIS architecture, that's why its function is explained in more detail in a separate chapter (see chapter 4.1.4), there you will also see what you have to do to configure the locator database correctly.

#### 4.1.4 Configuration of the locator database

The locator database is a variable component of the GFIS architecture that can be used to adjust the system to the specific environment of your GFIS Node. Using a locator database to set the location and the database type is an easy and user friendly way, because there is no need to change the complex scripting codes but instead you only have to edit the corresponding fields in the locator database.

The locator database is called *FISE* or *locator* and it contains two tables labelled with *DBName* and *DBType*. The table *DBName* lists information about the location of your metadatabases and the table *DBType* contains information about the type and format of the database used.

##### 4.1.4.1 The Table “DBName”

Structure:

| Column Name    | Description  |
|----------------|--|
| Available:     | Determines if the metadatabase is available or not. If this entry is true, the database will appear on the query form (see Figure 17) and will be searched according to the entered keywords.  |
| ID_DB:         | Unique identifier for the database.  |
| DB_Type:       | Unique Identifier for the type of the database. The codes given for this item refer to the content of the DBType table.  |
| DBDescription: | Brief description of the metadatabase  |
| URLwebsite:    | Complete URL address pointing to the directory that contains the GFIS download files listed in Table 2.  |
| DBName:        | Name of the metadatabase or ODBC or JDBC entry. The database has to be in the same directory like the GFIS software or in a subdirectory of it. If you place the database in a subdirectory you have to give the subdirectory name as well, e.g. subdir_name\db_name.mdb (see example in Table 4). |
| The_LinkURL:   | First part of the URL pointing to the resources if accessible on-line. This feature is only needed for a functionality of a GFIS mother web page .   |
| theLink:       | Number of the database fields to use as reference for the link (only needed for the mother web page functionality)   |
| theLinkURLend: | Last part of the URL, if needed (only needed for the mother web page functionality).   |

Table 3: Structure of the table DBName

Example:

| Available | ID DB | DB Type | DBDescription   | URLwebsite  | DBName               | The_LinkURL   | the Link | The Link URL end |
|-----------|-------|---------|---|---|----------------------|---|----------|------------------|
| Yes       | 1     | 1       | TFIS – JRC Tropical Forest Information System                       | <a href="http://www.trees.gvm.sai.jrc.it/fiseJRC/">http://www.trees.gvm.sai.jrc.it/fiseJRC/</a> | db\TFIS.mdb          | <a href="http://www.trees.gvm.sai.jrc.it/fiseJRC/build.asp?DB=1&amp;id=">http://www.trees.gvm.sai.jrc.it/fiseJRC/build.asp?DB=1&amp;id=</a> | 10       |                  |
| Yes       | 2     | 1       | ETFRN – European Tropical Forest Research Network - Forest Contacts | <a href="http://www.trees.gvm.sai.jrc.it/fiseJRC/">http://www.trees.gvm.sai.jrc.it/fiseJRC/</a> | db\ETFRN.mdb         | <a href="http://www.trees.gvm.sai.jrc.it/fiseJRC/build.asp?DB=1&amp;id=">http://www.trees.gvm.sai.jrc.it/fiseJRC/build.asp?DB=1&amp;id=</a> | 10       |                  |
| Yes       | 3     | 1       | EU Projects   | <a href="http://www.trees.gvm.sai.jrc.it/fiseJRC/">http://www.trees.gvm.sai.jrc.it/fiseJRC/</a> | db\odi_tropics.mdb   | <a href="http://www.oneworld.org/odi/tropics/projects/">http://www.oneworld.org/odi/tropics/projects/</a>                                   | 10       | .htm             |
| Yes       | 4     | 1       | FORIG – Forestry Research Institute of Ghana                        | <a href="http://www.trees.gvm.sai.jrc.it/fiseJRC/">http://www.trees.gvm.sai.jrc.it/fiseJRC/</a> | db\mill.mdb          | <a href="http://www.trees.gvm.sai.jrc.it/fiseJRC/build.asp?DB=4&amp;id=">http://www.trees.gvm.sai.jrc.it/fiseJRC/build.asp?DB=4&amp;id=</a> | 10       |                  |
| No        | 5     | 1       | CABI Forestry Abstracts   |   | db\cabi.mdb          | <a href="http://www.trees.gvm.sai.jrc.it/fiseJRC/build.asp?DB=4&amp;id=">http://www.trees.gvm.sai.jrc.it/fiseJRC/build.asp?DB=4&amp;id=</a> |          |                  |
| No        | 6     | 2       | TFIS – JRC Tropical Forest Information System on SQL server         | <a href="http://www.trees.gvm.sai.jrc.it/fiseJRC/">http://www.trees.gvm.sai.jrc.it/fiseJRC/</a> | TFIS_SQL             |   |          |                  |
| Yes       | 7     | 1       | Forest Conservation Archive   | <a href="http://www.trees.gvm.sai.jrc.it/fiseJRC/">http://www.trees.gvm.sai.jrc.it/fiseJRC/</a> | db\TFISxGlen.mdb     | <a href="http://www.trees.gvm.sai.jrc.it/fiseJRC/build.asp?DB=1&amp;id=">http://www.trees.gvm.sai.jrc.it/fiseJRC/build.asp?DB=1&amp;id=</a> |          |                  |
| Yes       | 8     | 1       | IUFRO Congress database   | <a href="http://www.trees.gvm.sai.jrc.it/fiseJRC/">http://www.trees.gvm.sai.jrc.it/fiseJRC/</a> | db\IUFRO_Meeting.MDB | <a href="http://www.trees.gvm.sai.jrc.it/fiseJRC/build.asp?DB=8&amp;id=">http://www.trees.gvm.sai.jrc.it/fiseJRC/build.asp?DB=8&amp;id=</a> | 10       |                  |
| No        | 9     | 1       | FAO metadatabase  |   | db\FAO_msacc.mdb     |   |          |                  |

Table 4: Example of a locator database

#### 4.1.4.2 The Table DBType

Structure:

| Column Name        | Description                                    |
|--------------------|--|
| DBType:            | Unique Identifier for the type of the database |
| DBTypeDescription: | Type of database                               |
| Accessible:        | Type of access via web page to the database    |

Table 5: Structure of table DBType

Example:

| DBType | DBTypeDescription     | Accessible |
|--------|-----------------------|------------|
| 1      | Access                | ODBC       |
| 2      | SQL-Server            | ODBC       |
| 3      | Oracle                | ODBC       |
| 4      | MySQL                 | ODBC       |
| 5      | CDS ISIS              |            |
| 6      | ADLib                 |            |
| 7      | Borland Interbase SQL |            |
| 8      | Postgress SQL         |            |
| 9      | Other                 |            |

Table 6: Example of table DBType

#### 4.1.4.3 Changing the necessary parameters of the table DBName

Every row in the table represents a Dublin Core compatible metadatabase that you can link to the GFIS system. To do so, you have to enable the access and query of the metadatabases by checking following fields in the locator database:

1. Set the corresponding field in the column **Available** to true (yes) to display the database on the query interface and to make it available for the search.
2. The **IDDB** is a unique identifier automatically given by the database, don't change this field.
3. The **DBType** defines the database you are using. The numbers refer to the table **DBType** (see Table 6) where 1 is defined as SQL-Server, 2 as Access etc. Select the number according to the database type you are using.
4. Please enter in the corresponding field of the **DBDescription** column a brief description of the content of your database. This information will be displayed on the query interface to help the user to select the right databases for his query (see Figure 17). Note that the field **Available** has to be set to *true*.
5. The column **URLWebsite** defines the web address of your GFIS Node. The URL given in this field has to point to the directory of the GFIS software, i.e. the GFIS download files listed in Table 2. This information tells the system where the program scripts, the locator database and the metadatabases are located. Please enter the correct web address of the GFIS files and scripts.
6. In the fields of the column **DBName** you have to write the name of the metadatabase. Please note that the metadatabase physically has to be either in the GFIS root directory given in the **URLWebsite** field or in a sub ordered folder of this directory. If you place the database in a subdirectory you have to add the name of the subdirectory to the database name, separated by a backslash, e.g. *subdir\_name\ db\_name.mdb* (see examples in Table 4).

The last three columns of the locator database are only needed if you want to expand the functionality of your GFIS Node to the features of the GFIS mother web pages where the user can add and search objects like announcement, event, plantation etc. (see details in chapter 3.1.2).

- The field *The\_LinkURL* is the First part of the URL pointing to the resources if accessible on-line. This feature is only needed for a functionality of a GFIS mother web page.
- The field *theLink* determines the Number of the database fields to use as reference for the link (only needed for the mother web page functionality)
- The field *theLinkURLend* Last part of the URL, if needed (only needed for the mother web page functionality)

#### **4.1.5 Addressing databases with JAFER**

Within the GFIS concept JAFER is used as an alternative way to access databases in a heterogeneous system environment using the Z39.50 protocol and Java.

Following is a brief description of the JAFER Toolkit Project at the University of Oxford, if you want to learn more about it please visit the JAFER web page at <http://www.lib.ox.ac.uk/jafer/>.

"Z39.50 is a computer-to-computer communications protocol designed to support searching and retrieval of information; full-text documents, bibliographic data, images and multimedia in a distributed network environment. Based on client/server architecture and operating over the Internet, the Z39.50 protocol is supporting an increasing number of applications" (Quote by William Moen on <http://www.lib.ox.ac.uk/jafer/>). The goal of Java Access For Electronic Resources (JAFER) is to produce an easy to use, visual toolkit to ensure that users can build portals and information sources without having to deal with the intricate aspects of the protocols involved, thus allowing them to concentrate on developing the actual content.

## **4.2 Setting up a GFIS compatible metadatabase**

As briefly explained in chapter 3.2.1 the format of the databases that contain the metadata about forestry related information has to be compatible with the GFIS metadata standard. This standardised form is basically derived from the work of the Dublin Core initiative. The Dublin Core is not an official metadata standard, but it is a commonly accepted and wide spread form to describe data and information especially of the library and publishing community. Please visit the official web site of the Dublin Core Initiative at <http://purl.org/DC> to learn more about it. It's a crucial feature of the GFIS system that exclusively metadatabases of a given format (including pre-defined Dublin Core elements) can be

addressed by the GFIS query software. That's why everybody who is interested in linking his database to the GFIS system has to use the metadatabase parameters defined by the IUFRO GFIS Task Force. A MS Access database template can be downloaded from the GFIS mother web page in Vienna or Ispra.

The GFIS system architecture works independent of the operating system and the database type, i.e. it will run on a Windows and Unix/Linux environment using different types of ODBC and JDBC compliant databases like those shown in Table 6. The following figure shows the structure of the database used to store GFIS compliant metadata.

| Field Name      | Data Type | Description  |
|-----------------|-----------|--|
| DC_Title        | Text      | A name given to the resource   |
| DC_Creator      | Text      | An entity primarily responsible for making the content of the resource   |
| DC_Subject      | Text      | The topic of the content of the resource   |
| DC_Description  | Text      | An account of the content of the resource  |
| DC_Publisher    | Text      | An entity responsible for making the resource available  |
| DC_Contributor  | Text      | An entity responsible for making contributions to the content of the resource  |
| DC_Date         | Date/Time | A date associated with an event in the life cycle of the resource (use YYYY-MM-DD format)  |
| DC_Type_ID      | Number    | The nature or genre of the content of the resource (ID from type table)  |
| DC_Format_ID    | Number    | The physical or digital manifestation of the resource (ID from format table)   |
| DC_Identifier   | Text      | An unambiguous reference to the resource within a given context  |
| DC_Source       | Text      | A Reference to a resource from which the present resource is derived   |
| DC_Language     | Text      | A language of the intellectual content of the resource   |
| DC_Relation     | Text      | A reference to a related resource  |
| DC_Coverage_ISO | Text      | The extent or scope of the content of the resource   |
| DC_Coverage_ulx | Number    | longitude of upper left corner of bounding rectangle, expressed in decimal degrees east (+ve) and west (-ve) of the Greenwich Meridian |
| DC_Coverage_uly | Number    | latitude of upper left corner of bounding rectangle  |
| DC_Coverage_lrx | Number    | longitude of lower right bounding rectangle  |
| DC_Coverage_lry | Number    | latitude of lower right bounding rectangle   |
| DC_coverage_ID  | Text      |  |
| DC_Rights       | Text      | Information about rights held in and over the resource   |
| GFIS_Status     | Text      | Quality check: information about the status of the resource (e.g. reviewed on ..., not reviewed etc.)                                  |

Figure 21: The structure of a GFIS compatible database using Dublin Core elements to describe the content of forestry related data and information.

If you plan to set up a metadatabase for the GFIS please download the templates from the GFIS IS web page or contact the IUFRO GFIS Task Force to get the necessary database parameters.

### 4.3 Using standardised forestry terms

The web based provision of globally available forestry data requires a certain standardisation of keywords and categories. In order to facilitate the access and the search for information GFIS is considering international standards to archive and sort the submitted information.

The IUFRO GFIS Task Force is discussing adequate standards, following is a proposal of a keyword list or a GFIS Thesauri based on the CAB and AgroVoc thesauri (by Roger Mills, see Consolidated GFIS documentation.doc).

#### 4.3.1 Proposal of a GFIS Thesauri (from Roger Mills)

The following terms are taken from AgroVoc and CABThesaurus grouped under 10 broad forestry headings and one general heading.

Terms unique to one or other Thesaurus are in square brackets, where no brackets are present, the term is in both thesauri.

arboriculture  
 [amenity forests]  
 [amenity planting]  
 arboreta  
 ornamental plants  
 tree surgery  
  
 forest ecology  
 biodiversity  
 canopy  
 forest litter  
 forest soils  
 forest trees  
 slash  
 synecology  
 wildlife  
  
 forest resources  
 [communal forests]  
 [forest land]  
 [forest ownership]  
 [production forests]  
 [protected forests]  
 [protection forests] / [protective forests]  
 forest plantations  
 [forest stands]  
 stand characteristics  
 [seed orchards] / [seed stands]  
  
 [forest policy] / [forestry policy]  
 forest economics  
 forestry development  
 social forestry  
  
 forest health  
 [forest pathology]  
 [forest dieback] / [dieback]  
 forest decline  
 forest pests  
  
 silviculture  
 intensive silviculture  
 regeneration  
 artificial regeneration  
 natural regeneration  
 silvicultural systems  
 [coppice system] / [coppice]  
 [coppice with standard system] /  
 [coppice with standards]  
 [high forest system] / high forest  
  
 forestry  
 plus trees  
 tree classes  
 forest management  
 genetic resources  
 afforestation  
 [felling cycle] / [rotations]

[multiple use forestry] / [multiple use]  
 forest inventories  
 stand improvement  
 [mensuration] / [forest mensuration]  
 [assortment tables] / [assortments]  
 dendrochronology  
 volume tables  
 [forest surveys] / [surveys]  
 [forest workers] / [forestry workers]  
 [foresters]  
 deforestation  
 geographical information systems  
 mapping [cartography]  
 remote sensing  
 urban forestry  
 [forest recreation] / [recreation]  
 [tree breeding]  
 controlled burning  
 forest fires  
 sustainability  
  
 forest products  
 [forest products industry] / [forest  
 products industries]  
 pulp and paper industry  
 wood  
 fuelwood  
 roundwood  
 sawnwood  
 wood technology  
 [nonwood forest products] / [non-wood  
 forest products]  
 [bark products]  
 bamboos  
 bark  
 canes and rattans  
 wood products  
 [wood extractives] / [wood extracts]  
 charcoal  
 wood panels  
 [timber trade] / [trade]  
 wood residues  
  
 agroforestry  
 [agrosilvicultural systems]  
 / [agrosilvocultural systems]  
 silvopastoral systems  
 [farm forestry]  
 shifting cultivation  
  
 [forestry operations] / [forestry  
 practices]  
 pruning  
 [forestry equipment] / [forestry  
 machinery]  
 logging  
 [long length logging]  
 [skidding] / [hauling]

felling  
shortwood logging  
tree length logging  
whole tree logging  
clear felling  
[primary conversion] / [primary  
conversion of wood]  
slashing  
barking  
  
(non-forestry general terms)  
agriculture  
biology

biotechnology  
botany  
climate  
desertification  
erosion  
evolution  
[extension] / [extension activities]  
gender  
meteorology  
sociology  
statistics  
training

#### **4.4 Backups of the GFIS Node**

In order to grant the best possible data security we recommend to back up the system regularly. The best practise is to use a streamer with several generations of data backups. We propose a daily backup from Monday to Friday using 5 generations of backup media, i.e. you have to provide a set of cartridges for every work day.

#### **4.5 Communication and collaboration within the GFIS**

As of the beginning of 2001 there are several GFIS Nodes installed and connected to the GFIS IS web page in Vienna. These nodes are:

- The CAB International, England
- The WCMC in Cambridge, England
- The FAO in Rome, Italy
- The SAI/GVM unit of the JRC in Ispra, Italy
- Gabon, Senegal and Ghana are presently available only as a Backup Version on the GFIS IS in Vienna.

Since the GFIS system is under permanent development a close collaboration between the GFIS Node administrators and the GFIS programme co-ordinator is necessary.

The programme co-ordinator is located at the IUFRO in Vienna, please contact him for general issues.

Address of GFIS Program Co-ordinator

To be completed. . . .

For technical problems, feedback and proposals please contact the responsible persons in Rome or Vienna.

Address of GFIS IT Experts

To be completed. . .

## **5 The FORNESSA Approach**

To be done ....

## 6 Glossary and Literature

### 6.1 Glossary of GFIS related terms

ACP: ACP countries are African countries that have ratified the Lome Convention.

API: Application Program Interface

ASP: Active Server Pages (ASP) is an open, compile-free application environment in which you can combine HTML, scripts, and reusable ActiveX server components to create dynamic and powerful Web-based business solutions. Active Server Pages enables server side scripting for IIS with native support for both VBScript and JScript.

CAB International: see <http://www.cabi.org>

EFI: The European Forest Institute in Joensuu, Finland

EFICS: The European Forest Information and Communication System. The establishment of the EFICS Regulation (established in 1989 by Council Regulation EEC No.1615/89) was a response to attempt to fulfil the increasing need to co-ordinate forest information among the Member States of the EU. Hence, the objective of the EFICS is to 'collect, co-ordinate, standardise, process and disseminate information concerning the forestry sector and its development'.

EFIS: European Forest Information System. From the beginning of 2001 until 2002 the European Forest Institute (EFI) is co-ordinating a research project initiated by the JRC in Ispra, Italy to develop a fully operational prototype of a reliable European Forest Information System (EFIS) – which is to compile, process, analyse and disseminate available forestry information of various heterogeneous data sources on an international, national and regional level. Furthermore the principles of EFIS will follow the activities of the IUFRO Global Forest Information Service (GFIS) Taskforce why EFIS can be seen as a future European GFIS node.

FGDC: Federal Geographic Data Committee ([www.fgdc.gov](http://www.fgdc.gov)), Content Standard for Digital Geospatial Metadata

FORNESSA:

GIST: Generic Information Server Toolkit, (<http://www.gist.jrc.it/default>)

GFIS: The Global Forest Information Service initiated by the IUFRO. The main technical components of the web based GFIS system are illustrated in Figure 22).

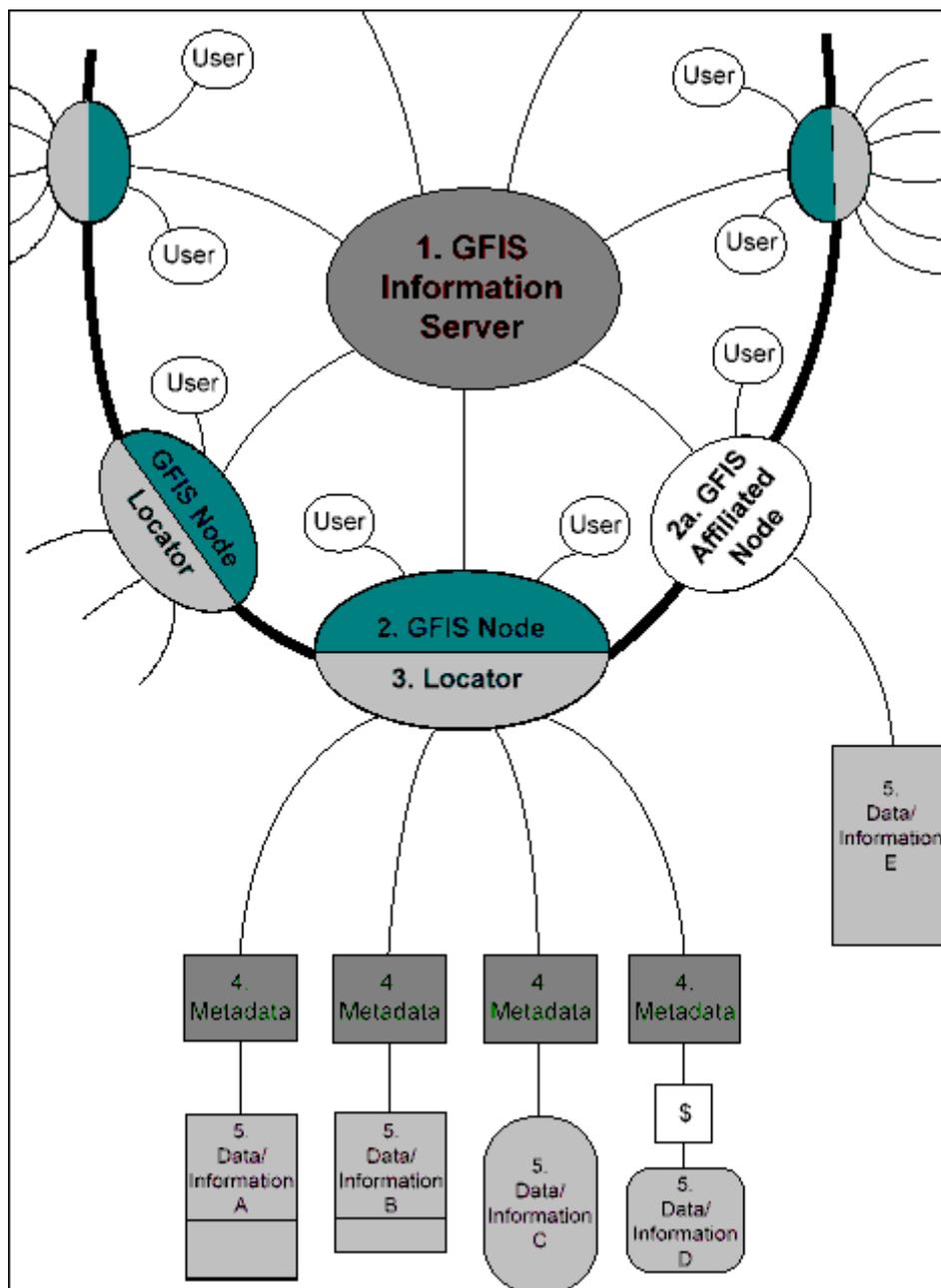


Figure 22: The GFIS concept

**GFIS Information Server (GFIS IS):** This will co-ordinate the house-keeping functions of the GFIS nodes (e.g., user registry, general information, discussion forums, list servers, gateway to distributed metadata catalogues).

**GFIS Node:** The first entry point for those accessing the GFIS will be a web site of a GFIS partner or node. From there, the user will be able to search simultaneously the metadata catalogues of all participating nodes to seek desired information.

**GFIS-affiliated node:** A forest-related web site that does not provide a metadata catalogue but which will be linked to the GFIS Information Server.

**IUFRO:** International Union of Forest Research Organisations

**ISO TC 211:** International Metadata Standard

(<http://www.statkart.no/isotc211/welcome.html>), set used e.g. by the Canadian Forest Service.

JAFER: The goal of Java Access For Electronic Resources (JAFER) is to produce an easy to use, visual toolkit to ensure that users can build portals and information sources without having to deal with the intricate aspects of the protocols involved, thus allowing them to concentrate on developing the actual content. Learn more about the JAFER Toolkit Project at <http://www.lib.ox.ac.uk/jafer>

Locator: The mechanism that facilitates interoperability among GFIS nodes The locator can be used to organise catalogues into thematic categories. Furthermore, it enables each GFIS node to be cognisant of all others, and can simultaneously query the metadata catalogues of all GFIS nodes in a single search operation.

Metadata: These are 'data about data' and are used to catalogue the data/information holdings of each GFIS node. A metadata catalogue contains an entry for each information resource of the affiliated node. Participants should be able to use their existing metadata catalogues with little modification. GFIS participants who do not yet have catalogues will be able to follow the metadata standards recommended by the GFIS as they create new catalogues.

Data/Information: These are the items that the user requires. The locator and metadata catalogues help the user to find the data/ information required. In Figure 22, polygons depicting data/information sets have varying shapes, sizes and shading, representing different content, spatial and temporal scales, format, and other attributes specific to each database. Data/information sets A-D all have standardised metadata to describe their contents; A and B also have some harmonised data, based on common standards, but C does not; D does not have free access, but the metadata may help the user determine if the data are worth purchasing. Data set E belongs to an affiliated node and is only a link without any added value by GFIS.

Z39.50 protocol: The International Standard Maintenance Agency Standard, which specifies a client/server-based protocol for searching and retrieving information from remote databases (<http://lcweb.loc.gov/z3950/agency>). "Z39.50 is an international standard for information retrieval that has its roots in the digital library community. It is both an ANSI standard and an ISO standard. The protocol specification standardizes the query syntax, search field identities and default format of returned records, and provides mechanisms for access control, and server self description. The Z39.50 information retrieval model is domain-independent; domain specializations are provided by an additional mechanism, referred to as a "application profiles." These are comprised of specific sets of attributes, operators and rules of implementation particular to a domain" (<http://ceonet.ccrs.nrcan.gc.ca/about/en/2.3.html#e>)

JDBC: The JDBC 2.0 API is the latest update of the JDBC API. It contains many new features, including scrollable result sets and the new SQL: 1999 (formerly SQL 3) data types (<http://java.sun.com/products/jdbc/features.html>).

## 6.2 Literature

Please see <http://iufro.boku.ac.at/iufro/taskforce/tfgfis/putfgfis.htm> for available online documents, if indicated in brackets [...].

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