

# Planning the transition from reporting on paper and diskettes to using the web

Use of EIONET from a member state viewpoint

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## Abstract

This paper describes plans and prospects for use of EIONET, the European Environment Information and Observation Network. A priority list of tools and facilities for data flow and communication is presented, including a new tool for document upload and discussions called Circle. Other facilities needed are a/o an e-mail phonebook with addresses, net based work plans for the data providers, a multilingual keyword list, news software, and a common look and feel.

Recommended formats for file exchanges are presented, and the need for standardised data exchange formats are discussed. The architecture for EIONET based databases is likewise discussed, followed by a case showing the magnitude of the challenge of turning the EEA into the one stop shop for data on the environment. Finally the plans for content on the three different types of EIONET servers are presented.

## I Introduction

EIONET, the European Environment Information and Observation Network, is an Internet based network established to facilitate flow of access to environmental data and information. The EIONET servers connecting the European countries with the European Environment Agency (EEA) will be used for exchange of

data and information to go into regular EEA reports on the environment.

The requirement for such an interstate network is that it should be of real help for the member states in their work, see also <http://www.nedev.com/ned-04-1998/ned-04-develop.p.html>, and that its structure is transparent for the end user. The ultimate goal for the network is that member states in the future will

only report once, in one format, to one recipient.

The way towards this target and the present plans will be the theme of this paper, as seen from a member state.

## 2 EIONET

### 2.1 Tasks of the EEA

The European Environment Agency is a/o established to record, collate and assess data on the state of environment, and according to the coming revision of its Regulation to promote the use of new telematics technology in its dissemination of information.

### 2.2 EIONET

EIONET is an Internet network connecting the EEA and its member states plus consultants. In 1997 the 15 EU countries joined the network, while the 3 EFTA countries and the European Topic Centres (ETC's, consultants to the EEA) are setting up their server this year.

Simultaneously the Eastern European countries – the PHARE states – are setting up their national servers, summing up to a total of around 50 servers in 1998.

Finally, up to 10 National Reference Centres per member state will join the network as users, meaning that EIONET in summer 1998 will have more than 500 users. In a foreseeable future additional employees at member state administrations may join in.

### 2.3 Member states

The member states have very disparate working conditions and not necessarily the same needs and possibilities as the EEA for exploitation of the network. Their environmental monitoring systems are likewise very different, even within the EU where efforts on harmonisation have been underway for years.

However, now each country has a National Focal Point (NFP) with the main objective to ensure optimal national co-operation with the EEA, and specifically ensure national delivery of high quality data.

In the member states National Reference Centres (NRC's) are established with the task to deliver data and information within their specific topic to the EEA or the ETC's. The NRC's will also evaluate the realism of project and monitoring proposals from the EEA, and provide scientific commenting of draft EEA reports.

This means that they need to be well informed about the activities in the EIONET.

As of today the following NRC's are in regular action, as the EEA has established a major activity within their field: NRC's for air quality, air emissions, inland surface waters + groundwater, marine and coastal environment, nature conservation, land cover, soil, and waste.

### 2.4 National Focal Point servers

As mentioned above, each member state now has an Internet server, equipped with Netscape Suitespot

3.1, plus a conferencing and document management package called Circle (see below).

The servers have not been much in use yet, but their future use has been discussed. In summary – for details see later – the NFP servers will be used as a repository for national deliveries – primarily to the EEA but later also to other international bodies.

Today the EIONET is an extranet, with access only provided username and password. The NFP will provide access and oversee the national data flow.

The running and maintenance costs of the NFP servers are at present estimated at 33.000 ECU's per year per country, including service contract, software updates, depreciation of hardware and personnel costs. As this is not an insignificant amount, only a success of the dataflow over the servers can assure continuous operation of the EIONET with so many servers.

Therefore a careful implementation of the dataflow is of utmost importance. Simultaneously the EEA should assure the well functioning of all the servers and their software by continuously supporting the server operators.

### 3 Data flow tools and communication facilities

The development of the electronic EIONET has to be driven to meet the needs for reporting from mem-

ber states to the EEA and reporting by the EEA, and this is also to a certain degree the case. For the most recent development plan see Norup (1997).

All the servers are equipped with Netscape Suitespot and Circle. However, when it comes to software on the end-user PC's the list of software is infinite. Therefore, any tool to be provided to the end-users has to consider this situation, and generic tools are preferred.

An actual priority list of tools and facilities is presented below:

#### 3.1 Document upload, and discussions

Priority number one is a tool for upload and download of files. This tool – Circle – is now being installed. Circle may be described as an overlay to the Suitespot sub-programmes.

Circle serves mainly as a document library and as a discussion forum. Circle bypasses the bottleneck of a web master by allowing the NRC's to upload files directly into a document library accessible by a normal web browser.

Circle enables uploading and downloading of documents (text, spreadsheets etc.), has bulletin boards for organised discussions, notifications for new uploaded documents or discussion threads, keyword search for any information, and a directory of users provides fine-tuned access control on documents in protected group collaboration areas of projects.

The main benefit of these functions is that working documents are maintained in hierarchies by the au-

thors themselves. Other collaborators can immediately check the status of the documents, and versions of documents can be organised and changes can be discussed on the shared bulletin boards.

But even though the new kind of Internet-based document management is the core function of Circle and EIONET, electronic mail still has a role. Automatic e-mail lists are being used for time-critical announcements that might go too long unnoticed in the bulletin boards of Circle.

### 3.2 Quality assurance of Circle and data flows

What is needed now in EIONET, after taking hundreds of new users aboard, is quality assurance, assuring that the users really can use the network and consider it useful.

The EIONET UserGroup has for 1998 planned 3 data flow cases - in air quality, air emissions, and inland waters - and these cases will show if Circle fulfils the needs. Member states and ETC's will need support from EEA for these data flow experiments.

We know already that access is not always possible, due to many reasons, but the problem is mainly with the EEA as its communications do not reach their target.

Likewise the facility for getting a notified document through an e-mail request has to be tested for all users, as it looks like firewalls may give problems for some users.

Another problem is that the existing interest groups in Circle are

requiring different usernames and passwords for the same person. This has to be solved by synchronisation of the access criteria. An even more elegant solution could be provision of a shareware tool like "Password Tracker De Luxe", so the enduser can access Circle groups with just one double-click.

And finally, as the document libraries grow their contents should be maintained and organised like any book shelf.

An operational problem is that some countries do not have the necessary time and/or knowledge to maintain their servers – and the coming Circle – sufficiently well. A solution could be that even if Circle is installed on every server, the only Circle used for the first year is that on the EEA server. Meanwhile, or in return, this server with its Circle is maintained as a highest priority by the EEA, so users never will have problems with it. If users are happy with using EIONET, then the EIONET is a success, and this is what we all should strive for.

If wanted, or necessary for sufficient speed of access, the EEA Circle could be replicated overnight to all the other sites. Such a replication is by the way a mechanism that should be studied further, as countries do not necessarily have the time or know-how needed for a sufficient maintenance of the servers.

One might argue, that the success of Circle within a year is the primary target, and that resources should be directed to this task as far as necessary.

### 3.3 Directory or phonebook

Much needed is also a phonebook where the e-mail addresses, and maybe also addresses and telephone numbers of all the EIONET members can be looked up. Such a tool already exists as a database searchable through the web, but it is not integrated into the desktop of the end-user yet.

What is needed is a facility to find an e-mail address through the mail client. Such a solution could be to use LDAP directories as part of the e-mail client, a solution explored at the EEA today.

Another possibility could be to exploit the possibility of connecting Outlook 98 with Microsoft Access. However, this solution would require all sites to install MS Office, a solution discussed many times but refused for many reasons.

A facility enabling access to addresses through any word processor would also be most welcome.

### 3.4 NRC work plans

A product much needed, and now underway, is a table for the NRC's describing the deliveries and other tasks for the coming year – a work plan for the NRC's. Every year at the presentation of the 2<sup>nd</sup> draft of the forthcoming AWP, the EEA should publish on the network a one-page table describing the tasks of the National Reference Centres (see Appendix). The tables should describe the expected deliveries and activities so the tasks are clear for everybody within the national administrations

without the need for detailed knowledge of the subject. The minimum is a clear reference and hyperlink to the legal framework (directories or conventions) or the topic within the EEA work programme. The reference should then describe the context and show the parameters, stations, methodology etc. to be used in case of data update or collection.

A proposal for such a table is in the following page.

Given such a table for the NRC's the task of planning the national work and assuring the needed national resources will be straightforward for the member state authorities.

### 3.5 Thesaurus

The EEA is now nearly completing a multilingual list of environmental terms, a thesaurus. It will come in very handy to assist in for example quality check of translations to national languages, to be used for keyword searching in EIONET text pages, and for the indexing of new records for the Agency catalogue of data sources. The thesaurus will be available this year in most of the Western European languages.

### 3.6 General information for EIONET partners

Tools for informing the member state partners in general are needed. Tools like PointCast are now being explored by the EEA in a pilot project, studying their feasibility for easy and direct delivery to NFP's, NRC's and ETC's of useful information on EIONET.

### 3.7 End-user training and ease of use

As most national administration employees are not experienced Internet surfers training is needed whenever a new tool is introduced. This is the case right now, where all NRC's are invited by EEA to be trained in Circle; hopefully dataflow will start not so late after this event, so the trained know-how can be used.

Equally important is continuous training of system operators in the member states.

### 3.8 General ease of use

Any tool introduced into a network like EIONET should be extremely easy to use, and maintained continuously by the EEA.

At the present state of the electronic EIONET it is not clear if anything else on the servers but Circle will be used to any significant degree for the first year or two. However, if member states start to make HTML pages to any significant degree, then a proposal for a common look-and-feel of the web sites is needed, including recommendations on the use or not of XML, CSS etc. A freeware web site programming and management tool like Frontier, <http://www.scripting.com/frontier5/>, should also be considered.

### 3.9 Chatting real time

Users could chat over the Internet on actual problems with products like ICQ, <http://www.mirabilis.com/>, substituting difficult and expensive

telephone meetings. The tools are there, but they have not been exploited yet, as many are not so experienced Internet users.

### 3.10 The more distant future

In some years we might see tools for network computing, for example for scenario modelling over the web. A product like Tarantella from SCO, <http://tarantella.sco.com/info/info8.html>, could be a solution for this by its making a PC into a dumb terminal in relation to a model software server.

GIS systems will also be part of EIONET in some years, and we may exploit tools like GeoMedia Web Map, <http://www.geoplace.com/print/gw/1997/0997/GW970900feat4.html>. It produces real vector based maps in WWW format with direct link to a GIS database, and thus avoiding the trouble of making graphic copies of vector maps. For further references see [http://www.blm.gov/gis/metadata\\_doc.html](http://www.blm.gov/gis/metadata_doc.html).

Workflow tools to help build process-automation solutions have been studied for EIONET purposes for some time and the emergence of the Simple Workflow Access Protocol (SWAP) [http://biz.yahoo.com/prnews/980413/ca\\_netscap\\_1.html](http://biz.yahoo.com/prnews/980413/ca_netscap_1.html), a standard for interoperable workflow products from multiple vendors, is welcomed. SWAP will be an extension of the HTTP 1.1 standard.

## 4 Internet reporting – topics and problems

### 4.1 Topics

The EIONET UserGroup has as mentioned above identified 3 cases where dataflow should be initiated and experimented with.

The two air topics both have a long history, as they have been reported for up to 10 years – air emission reporting has been carried out under the CORINAIR programme, and air quality under various conventions and directives. Under construction is EUROWATERNET – a network for monitoring and data collection on inland waters.

More networks are to come, as the long term plan is to use EIONET for any compliance reporting under the various environment related EU directives. In the nearest future NATURA 2000 – nature conservation – may be in operation through the EIONET too, and later on comes networks for reporting on a/o soil and waste.

### 4.2 Text exchange formats

There has been much discussion on the file formats to use in EIONET. The most recent proposal is the following:

- always use the DOS convention for names (8.3)
- for text files use HTML or PDF
- if this is not possible use Word 6 or Excel 5 or PowerPoint 4/95

Always to be remembered is that the EIONET is so diverse that the recipi-

ent easily may have software and operating systems differing from the senders.

### 4.3 Data exchange formats

When databases are more used in the net we will need standard formats for data to go into the databases. Two internationally recognised formats for marine data exchange exist, one called FGDC, described at <http://fgdc.er.usgs.gov/index.html> and another named DIF. Standards for other topics should be identified for use in EIONET.

However, even if direct database input is not used, a common format for data is advisable to simplify aggregation. The Topic Centre for Air Quality, Air Emissions, and Inland Waters are all working on this issue right now.

The air topic centres are currently making input software to be installed on the PC's of the data providers, while the inland waters topic centre specifies the layout of the spreadsheet to be used for reporting.

The European Topic Centre on Catalogue of Data Sources has recently finished input software for the provision of data on national reports. This software may also be of inspiration for the rest of the topic centres.

A recent development is the facility in Adobe Acrobat for making electronic forms for replacement of questionnaires or for input forms. They should allow automatic input into databases. Reference is <http://www.adobe.com/aboutadobe/publicrelations/HTML/9801/980126.pdfforms.html>.

## 4.4 Databases on the Internet

Countries have for years collected environmental data and stored them in databases but these databases have been more or less inaccessible, and it has been practically impossible to see what was available within a given area or topic.

The technical reason for this problem is to be found in varying data structures, different names for identical parameters, and lack of physical access to data. Other reasons are to be sought in copyright considerations and security concerns.

Databases are typically presented on the Internet as metadata catalogues without access to the real database with the raw data. However, tools are now available to publish databases on the net without much trouble.

One solution for an Internet database is to publish it in two parts – as metadata and as parameters. The metadata give information on the topics, measuring stations, time periods, institutions, contact persons etc. There is public access to the metadata part, but password is required for access to the parameter part containing the measurements.

This approach has been used in the DemoWad project ([www.dawad.dk](http://www.dawad.dk)), a result of the tri-lateral Wadden Sea co-operation between Denmark, Germany and The Netherlands. 3 databases are created, with one in each country, and with equal database structure. National data are transferred to these databases, and a common home page allows access to each of the databases.

Identical user interfaces are provided for each database, allowing search by topic, station, area or time period.

The REMSSBOT project, <http://www.netor.gr/remssbot/index.htm>, uses a different approach, with different database software on the involved servers. Access (data retrieval and filtering) is provided through CORBA (Common Object Request Brokering Architecture), which only requires a certain minimal common data structure. The same functionality is provided by the DCOM architecture.

The REMSSBOT main objective is sharing environmental information, not by building a centralised data warehouse, but by keeping the data at its original location.

Still to be experimented with, and later decided on, is whether single databases, distributed databases, or replicated databases are most feasible in EIONET.

## 4.5 Case: Air emission reporting for Dobris+3

As a case to illustrate the complexity of dataflow in EIONET and the size of the challenge is below described the data collection in relation to air emissions during the preparation of the newest EEA report “Europe’s environment; the second assessment”, also called Dobris+3.

Several data sources were available, namely CLRTAP/ EMEP (the Geneva convention), UNFCCC (the climate convention), the EU greenhouse gas monitoring mechanism, HELCOM, OSPARCOM, and CORINAIR.



These data collections serve different purposes and contain somehow different data. Some provide national totals and/or subtotals for sectors. Some have very detailed sector data, data are from 1980 to 90 or 95, and countries covered are EU15 or some EU countries or more countries - even up to 30. The list of parameters consists of one or several among SO<sub>2</sub>, NO<sub>x</sub>, CH<sub>4</sub>, NMVOC, CO, NH<sub>3</sub>, HM, POP, and the date for reporting is not the same.

Such a situation is really a challenge, when none of the data sets are enough for the purpose.

It is therefore clear that the goal is to have one reporting system covering all needs within air emissions, and CORINAIR is planned to be this system – the core annual European air emission inventory. CORINAIR includes a guidebook, software, and a fixed nomenclature.

The plan is that EEA will be the official rapporteur to UNFCCC and UNECE, and measures towards this goal are underway by negotiating with the international bodies and the member states.

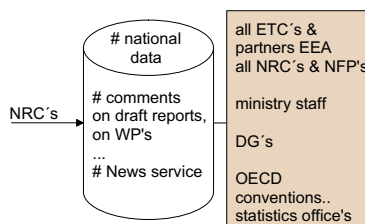
An evolution towards such a system may be foreseen within all topics, also as EU has ratified several international conventions and as a consistent EU reporting is needed.

#### 4.6 Proposed use of EIONET servers

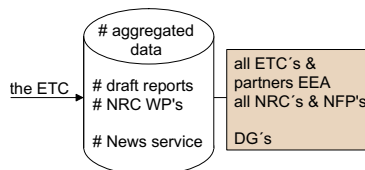
In a hearing of the EU15+3 member states November 1997 all countries agreed to a proposal for use of the EIONET servers (Fig. 1).

Whether some data will be put on servers at the data owners – the National Reference Centres – or whether all data will go to the NFP server has to be shown.

##### Use of NFP servers



##### Use of ETC servers



##### Use of EEA server

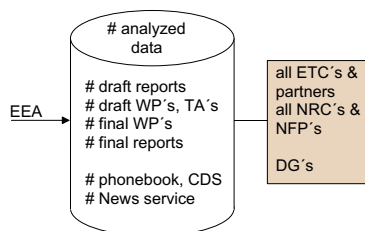


Figure 1. The use of EIONET servers.

#### References

Norup, B. 1997. Towards collaboration and data sharing. A workplan for furnishing the EIONET. A report to the EEA, May 1997.

## Appendix. National Reference Centre activity plan.

National Reference Centre activity plan					
Topic: (for example Air emissions)					
Event/activity	Event date	Response deadline	Expected output	Expected output date	Contact person
<i>short name of the delivery</i>	<i>date for dispatch of request</i>	<i>date for deadline</i>	<i>name of final product – where can the national delivery be found or where is it integrated</i>	<i>date for final product</i>	<i>name and e-mail of person to contact at the EEA or ETC</i>
	<i>exact description of the requested delivery (requester, legal context, annual or multiannual work programme topic, or technical report)</i>				
examples:					
<b>Data updates</b>					
EU15 emission inventory, GHG, 1996 data	March 1998	15 April	submission to UNFCCC + Corinair96 data (Technical report)	May 1998	
	request done by DGXI, with ETC/AE assisting in data collection, validation and reporting for both the Monitoring Mechanism and the EU15 estimates for UNFCCC				
EU15 emission inventory, GHG + other gases	December 1998	31 December 1998	EU submission to UNECE/CLRTAP + Corinair97 data (Technical report)	Jan-March 1999	
	request done by UNECE/CLRTAP with ETC/AE assisting DGXI to prepare EU15 estimates				
<b>Questionnaires</b>					
to be described as above					
<b>Draft reports for review</b>					
Corinair 1990-1996 emission inventories	1 June 1998	1 July 1998	Topic report	July-Aug 1999	
<b>Workshops</b>					
name of workshop					
	who should attend, who pays for expenses				