EIONET: Intranet, Extranet, and beyond

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Abstract

The European Environment Agency (EEA) is the environmental information centre of the European Union. Its main instrument is a large network, called EIONET (European Environment Information and Observation Network). EIONET is both an organisational and telematic network. The core of EIONET is an began as an Intranet that connects a total of 40 National Focal Points, European Topic Centres, and Phare NFPs with EEA. However, the Intranet concept was soon abandoned for a more flexible Extranet architecture that also allows hundreds of National Reference Centres, Topic Centre partners, European institutions to actively participate. Beyond this, EEA coordinates some collaborative activities, such as information locators and global clearing-houses, in the public and semi-public Internet.

The paper discusses mapping of this diverse organisational network into an effective telecommunications structure that takes into account the rapidly changing needs of users, working group dynamics, and advancement of technology. To meet this challenge, structured forms of communication such as discussion forums and project homepages where documents are uploaded, are being implemented. A distributed directory service with linkages to environmental information sources is also essential. Further developments include a push technology channel for news webcasting and development towards an electronic reference centre for all environmental information. EIONET also provides building blocks for setting up national environmental networks.

1   Introduction

In 1990, the European Council passed the legislation to establish the European Environment Agency (EEA) as the environmental information centre for the European Union. At the same time it was deemed that the EEA be a small nucleus of a large network, which was named the

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European Environment Information and Observation Network (EIONET).

The main purpose of EEA and EIONET is to report on the state of Europe's environment so that the European Union and the Member States have a solid basis for developing their legislation. Hence, the EEA's main customers are governments and their decision-makers. The regulation on EEA also charges the EEA to use its network to ensure that the citizens are properly informed about the environment. *Dobris Assessment,* the first holistic report was published in 1995 (Stanners and Bourdeau 1995), and its next version is due out in June 1998. This and other reports are also available at EEA's website (http://www.eea.eu.int/).

Producing such colossal overviews requires an effective telematic network – the EIONET – to be set up. This means that the EEA necessarily accumulates expertise and know-how on telecommunication and networking. These are now recognised as the vehicles to further develop new kinds of products and services. Indeed, the first review of EEA and EIONET made by the European Council in 1997 determines that EEA shall especially become an electronic reference centre for environmental information. With the rapid advances in Internet, such as push technology and powerful information locators, there are very good prospects for this. Beyond the horizon, the new digital satellite vision holds a promise totally new types of environmental information services.

2 The onion model of EIONET

The EIONET has already evolved considerably during its short life. It consists of four main types of nodes. A National Focal Point (NFP) is typically a small unit in a Member State's environmental administration that coordinates European activities. There are NFPs in all EU, EFTA, and Phare countries. National Reference Centres (NRC) are major research institutes that collaborate with the NFP to provide the information to Europe-wide databases. European Topic Centres (ETC) are special contractors of EEA who coordinate activities in their thematic areas. Currently there are ETCs for air quality, air emissions, soil, inland waters, marine and coast, nature, land cover, waste, and cataloguing of data sources. Each ETC has a number of partners. In Phare countries, Phare Topic Links provide the same function and extend the ETCs.

There are no less than 600 nodes nominated officially for EIONET, but less than 200 have been actively participating. Mapping this diverse organisational network into an effective telecommunications structure, which takes into account the needs of users, working group dynamics, and the necessary security measures, has been a major challenge. A layered model (Figure 1) with some different rules for the different zones, and the most widely adopted technological standards (i.e., Internet), have been adopted for EIONET.

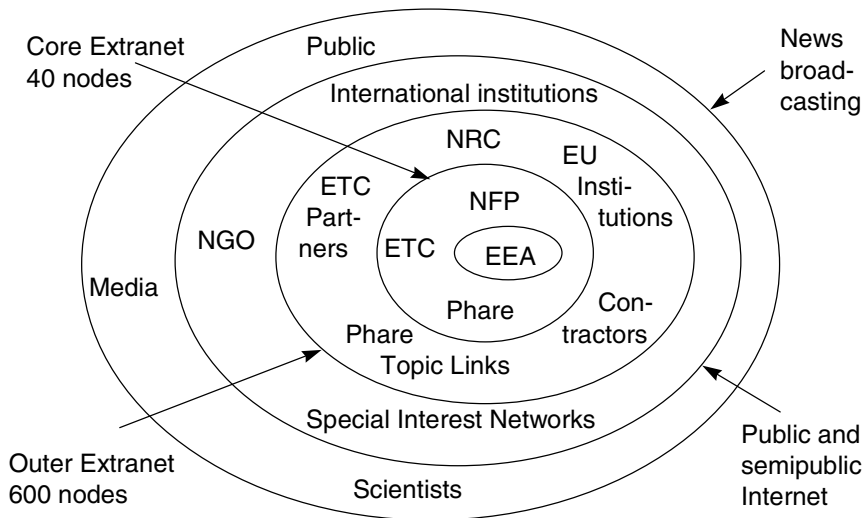The core of EIONET is an Extranet that connects the NFPs, ETCs,

Figure 1. The EIONET consists of layers for core Extranet, outer EIONET, semi-public networks, and open information dissemination. For abbreviations, see text.

and Phare NFPs with EEA. By definition (http://whatis.com/) an Extranet is a username/password protected collaborative network of information suppliers and consumers on Internet. The main functionality on core EIONET is document management. The content is dominated by drafts and final reports on state of environment, information on project co-ordination, addresses, meetings, and meta-information. It has been built by EEA and its contractor, Finsiel SpA., in 1995-98 with the support of European Commission's DGIII IDA Programme (Europe's Environment Network 1997) and that of DGIA. EIONET that now consist of 40 physical nodes, is one of the pioneering Extranet projects among European institutions.Initially the core

EIONET began as an Intranet, which is a physically protected corporate network governed by a common security policy (http://whatis.com/). However, this model was soon found too restrictive, when connections beyond the core EIONET were needed, and a pure Extranet architecture was adopted.

The outer EIONET, which also is an Extranet (Figure 1), has a somewhat different group of users and functions than the core. It mainly consists of working groups at national level and within the partners of ETCs. Document management again is important, but the needs for database management, especially the possibility to upload extracts from operational databases at NRCs to data warehouses at NFPs and ETCs

become important. However, currently these services are still being shaped.

EIONET is also an Internet player, actively promoting Special Interest Networks (http://www.csu.edu.au/links/sin/sin.html) such as BALLERINA (http://www.baltic-region.net/) on the environment in the Baltic Sea area, and collaborating with international institutions with their network-based efforts, such as the project on the Clearing-house of the Convention on Biological Diversity (http://www.biodiv.org/). Although all the finished documents that have been produced within EIONET go to the through the public websites (http://www.eea.eu.int/), the public dimensions of EIONET still await a full implementation during 1998–2000. Beyond the present Internet of passive web sites, EIONET is looking

at emerging technologies for actively pushing and broadcasting environmental news to the widest possible audience.

3 Services that support group collaboration

The functionality on the EIONET is provided by the full range of Netscape server technology on Unix. In order to achieve a full-function network, the services will have to be built with a layered approach so that more advanced forms of communication build on top of the basic ones (Figure 2). At the top of the services there is a groupware package called CIRCLE (Centre for Information Resources for Collaboration on Environment). It ties all the other serv-
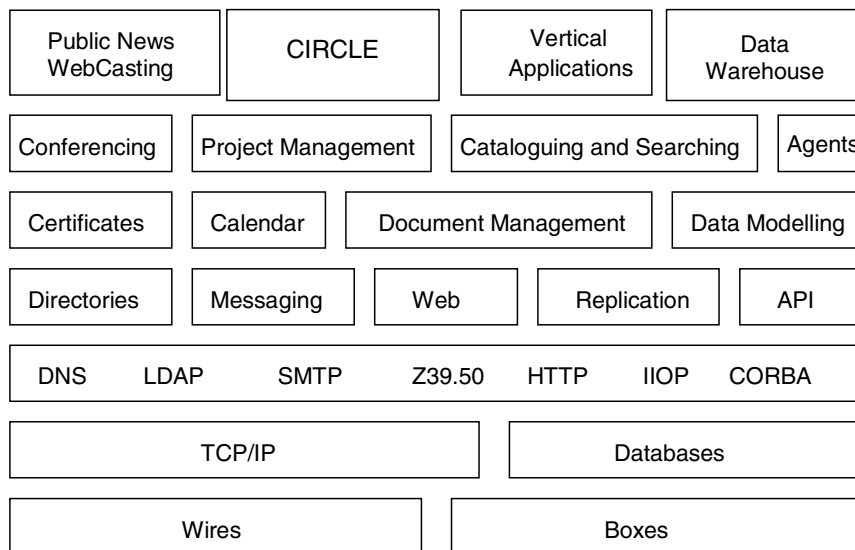

Figure 2. The layered architecture of EIONET's services.

ices together, and provides the shared group collaboration areas for projects, which are called Interest Groups (Figure 3). CIRCLE is a generic service that has been developed by European Dynamics S.A. (http://www.eurodyn.com.gr/) for the IDA Programme (Europe's Environment Network 1997). It is being installed on all EIONET servers.

Few aspects of these layered services are worth discussing here. Electronic mail has become a major contributor to information overload lately. Therefore, more structured forms of communication such as discussion forums and project home-pages where documents are uploaded, are being implemented. A full-blown distributed directory service across all the hundreds of EIONET organisations is also essential. In document management, the web-master has been bypassed entirely, and users themselves do document uploads to Interest Groups on CIRCLE servers.

Out of the vertical applications being built on top of EIONET platform, the most central is Catalogue

Figure 3. A screen from EIONET showing the document management functions of CIRCLE.

of Data Sources (CDS), which consists of a data directory, address database and a multilingual thesaurus (http://www.mu.niedersachsen.de/system/cds/). It serves as the key link to all the other data sources on EIONET.

4 Dataflow automation – towards one-stop reporting

The current state of online databases on EIONET is not very advanced – only a few are publicly available, such as prototype web front-ends to the legacy CORINE land cover and biotope databases (see http://www.eea.eu.int/; also on CD-ROM). Unlike some services like the U.S. EPA Envirofacts (http://www.epa.gov/envirofacts/), there is not yet a central database on EIONET. Instead, a distributed data warehouse system is being set up (Figure 4). This is done to alleviate the problem that in Member States, the same people will have to report same or slightly different data repeatedly to various data collection systems, such as those of Eurostat, European Commission, EEA, OECD, and various conventions. For historical reasons, overlapping dataflows have been set up on an ad hoc manner, but now need to be connected. The data warehouse functionality on EIONET servers should streamline this by making EIONET server the single place where data will be reported. The various users of data could then access it from there.

New networks can now be built directly on top of this existing EIONET infrastructure, avoiding overlapping and duplication of effort. This is now happening with the Clearing-House Mechanism (CHM) of the Convention of Biological Diversity (http://www.biodiv.org/). Instead of again erecting an independent data collection network in Europe, it has been planned that the CHM will be hosted on EIONET.

This approach will give good possibilities for automating the dataflows in small steps. EEA is also working on projects that in future may employ intelligent agents to locate and retrieve data from EIONET to the users (http://www.mcc.com/projects/infosleuth/).

5 EIONET as an integrative platform

Environmental issues are cross-cutting and the New Treaty demands that sustainability be taken as a guide for all economic activities. This means that users of EIONET who study the environmental impacts increasingly will need data and information from adjacent economic sectors such as energy, transport, forests, agriculture, etc. Lots of sectoral networks have been created in Europe lately, and many of them are migrating to an Intranet/Extranet way of operating just now. These developments are very relevant for EIONET, because if there is a well operating network on a sector adjacent to EIONET, it may be possible to tap
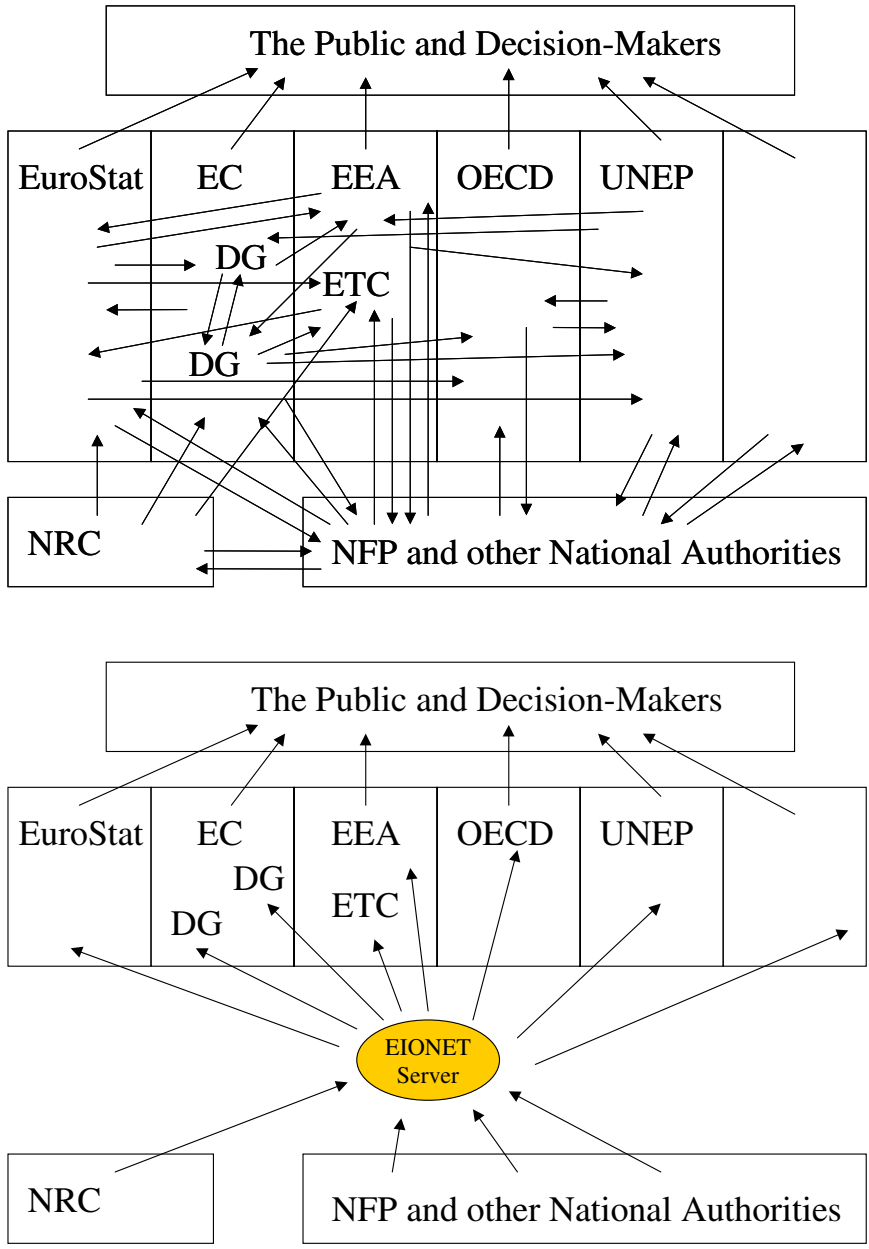
Figure 4. The upper picture illustrates the current situation with historically born ad hoc dataflows on floppies, email, fax and letter. These overlapping dataflows can be streamlined into EIONET's common infrastucture.

in its dataflows instead of creating a redundant reporting system on EIONET. However, there danger that overlapping networks will be born will have to be watched carefully, and for this reason, for instance, the new network for the Clearing House of the Convention of Biodiversity should be hosted on EIONET. The current convergence of technology to Internet will make it increasingly easy to integrate different networks. The solutions chosen for EIONET, Extranet and group collaboration on CIRCLE, are very generic and could easily be duplicated on other networks. In essence, we need to clone EIONET to other economic sectors.

EIONET also can provide a platform for new telematics applications. There is a large user base, well-developed authentication services and increasingly there will be a data base that can be used for automatically generating syntheses of the state of environment.

6   Conclusion

EIONET started as a closed network but is increasingly opening up to new partners. We are still taking the first steps in opening up the information sources on environment and connecting to the real sources of information. In future these connections will be reinforced and increasingly automated.

The best available environmental information is not always with gov-

ernments, but with museums, research groups, NGOs, etc., for which a place must be found in EIONET. Open access to environmental information is the best guarantee that improvement in the state of environment can be achieved. When information is released, it will create positive pressure from the citizens towards those who place stress on environment. It will also lead into increased quality control on the information itself. New forms of electronic democracy are being created around the discussion on the state of environment.

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