INTERNET ELECTRONIC MAIL
A TELEMATIC TOOL
FOR PUBLIC HEALTH IN FRENCH-SPEAKING AFRICA

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Abstarct :

ORSTOM has for the last 5 years been carrying out a programme developing telematic links in French-speaking Africa (RIO programme). A network linking a hundred establishments in 10 countries is currently operational and is linked to the major international education and research networks. It uses tried and tested techniques which were at the origin of Internet, their low cost allowing them to be used on a large scale.

Around fifty research establishments, in education and cooperation in the field of health, are at present linked to the network. This encouraging result proves the feasibility of the project presented here.

In each French-speaking country in West Africa, the aim is to integrate, in a network of electronic mail and electronic forum , the main healthcare establishments and medical schools and universities, as well as those civil servants responsible for public health.

The system, based on Internet technologies (Email), will use the computing equipment already in use in these establishments (micro-computers) and local dialup lines. It will allow the circulation of general and specific news bulletins and the organisation of professional discussions between establishments of the sub-region. Finally, it will encourage cooperation with specialised establishments in northern Europe.

1. The experience of the RIO project

1.1. Historical background

From 1989, a programme was launched to ensure the equiping of the African laboratories of ORSTOM with UNIX workstations and their interconnexion to the network. The first "RIO site" was set up in Dakar, and then the year after others followed in Ouagadougou, Bamako and Lomé.

Based on the standard technologies of the UNIX system - Ethernet, TCP/IP, UUCP - the Orstom network was from the outset attached to international research and higher education networks, which in turn gave rise to *Internet*.. It was thus designed as a means of developing exchanges between the scientific community of developing countries and those in the North.

Electronic mail was quickly adopted by researchers working in Africa and the overseas territories. Some Research Units used it as the main means for their internal communication. The "email" slowly became essential and was proposed to Orstom's partners, beginning with ISRA (Institut sénégalais de recherche agronomique) and the CRO (Centre de recherche océanographique d'Abidjan)...

In 1992, Orstom decided to develop this even further and to share its network with all those involved in research and development. A charter was proposed to those organisations wishing to be associated with the network. RIO was also associated with the events of the World Summit. Working with IGC (APC) and Alternex (Brazil), it offered its services to all organisations, official or NGO's, taking part in the United Nations Conference on the Environment and on Development (CNUED). The French version of the official texts was sent to all sites in tropical countries, and electronic mail was made available to all those wishing to contact their delegations in Rio de Janeiro.

In order to finance the expansion of the network, a system of agreements was set up. The use of international links is monitored and each organisation contributes to running costs.

Today, "National" Internet networks are beginning to develop in Senegal, Mali, Burkina-Faso... Engineering schools, research centres, but also private-sector companies are about to acquire this technology and to take over Orstom's initial role.

1.2. Organisation and techniques used

• **The backbone**

In each country (Senegal, Mali, Burkina-Faso, Niger, Côte d'Ivoire, Togo, Congo, Cameroon, the Seychelles, Madagascar, RCA*, Guinea*), "a main node" ensures the link for international communications. For the moment, it is generally the computing

departments of the Orstom centres which house the main nodes and ensure their maintenance. It is around these sites that the other ramifications of the network in that country then develop.

All of the main nodes form the backbone of the network, along with the Coordination Centre (RIO department) in Montpellier. The reliability of the whole of the system depends on the stability of this structure. The local managers form, together with the technicians of the Coordination Centre, a united North/South team to ensure continuity in the service provided.

The existence of the "ORSTOM system" plays a vital role in this case. The centres and missions- thanks to the stability of their installations (telephone, electric power supply, air conditioning...), to their long-term commitment and to lasting partnerships with national research and higher education establishments - provide an ideal support base for the research networks.
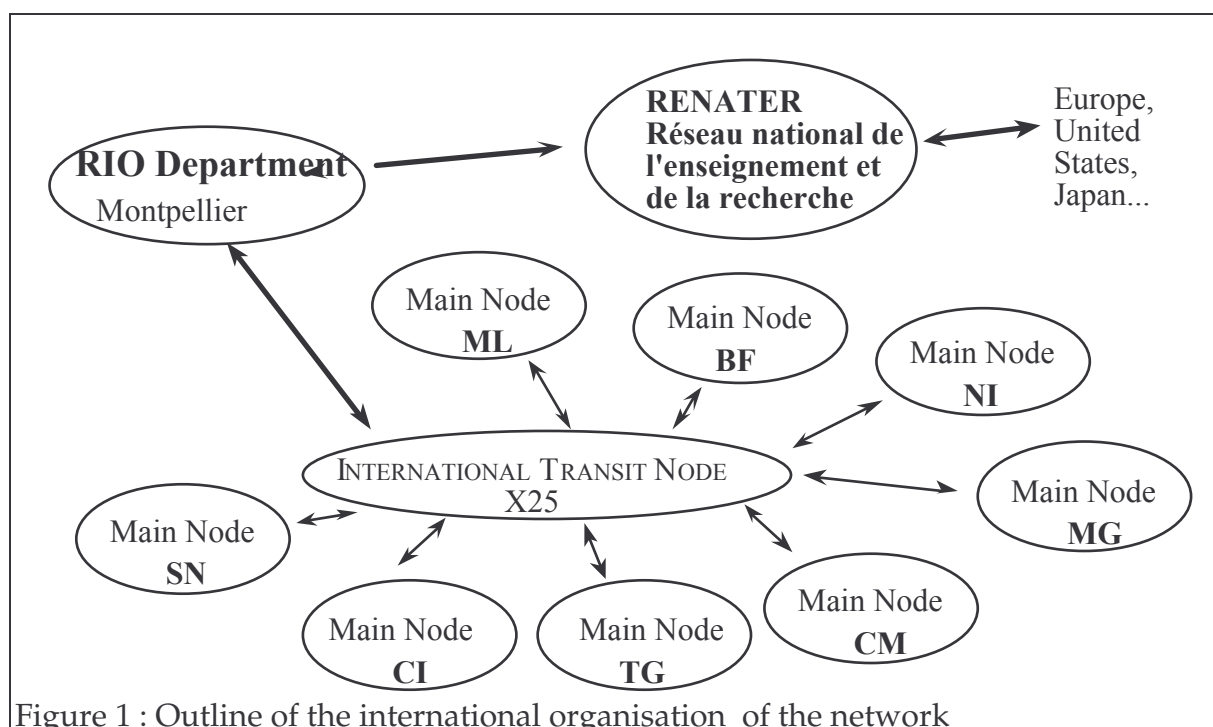

Figure 1 : Outline of the international organisation of the network

- **The computers**

The main nodes and the central site are fitted with UNIX (Sun Sparc) workstations. Most of them have access to another station ready to take over in case of failure (backup). The other network nodes are either UNIX workstations or personal micro-computers (PC or MAC).

- **Telecommunications**

International links are generally made on switched packet public networks (X25 norms), whereas local links use dialup lines (RTC). The X25 links guarantee

enormous reliability to the backbone of the network and thus to the system as a whole. Moreover, they make telemaintenance operations much easier.

The sending of mail is deferred (store & forward mode). In other words, mail is grouped together, compressed and sent as a batch so as to keep transmission costs to a minimum (UUCP protocol). The interactive services of Internet (ftp, telnet, gopher, mosaïc...) require a direct link (IP/X25 or PPP protocol). These services are installed and are available, but are not proposed to users because at present they involve high transmission costs.

RIO encourages the use of electronic mail (*email*) and of all its associated services: *listserv* (electronic forum, automatic circulation of news bulletins), *FTPmail* (access by mail to the programme libraries), WAISmail (documentary databases of Internet)...

Access to interactive services, and in particular to the multimedia databases (World Wide Web), is only possible, at reasonable prices and under acceptable conditions, through specialised permanent high-speed links. These remain very costly and the speeds available in Africa are at present insufficient.

End-users access to the network from a personal computer (PC or Macintosh). This is generally linked to the local server by telephone through a standard modem (V22). The device is equiped with an electronic mail management programme (mail and telecommunications processing) which makes it easier to use than a word processor.
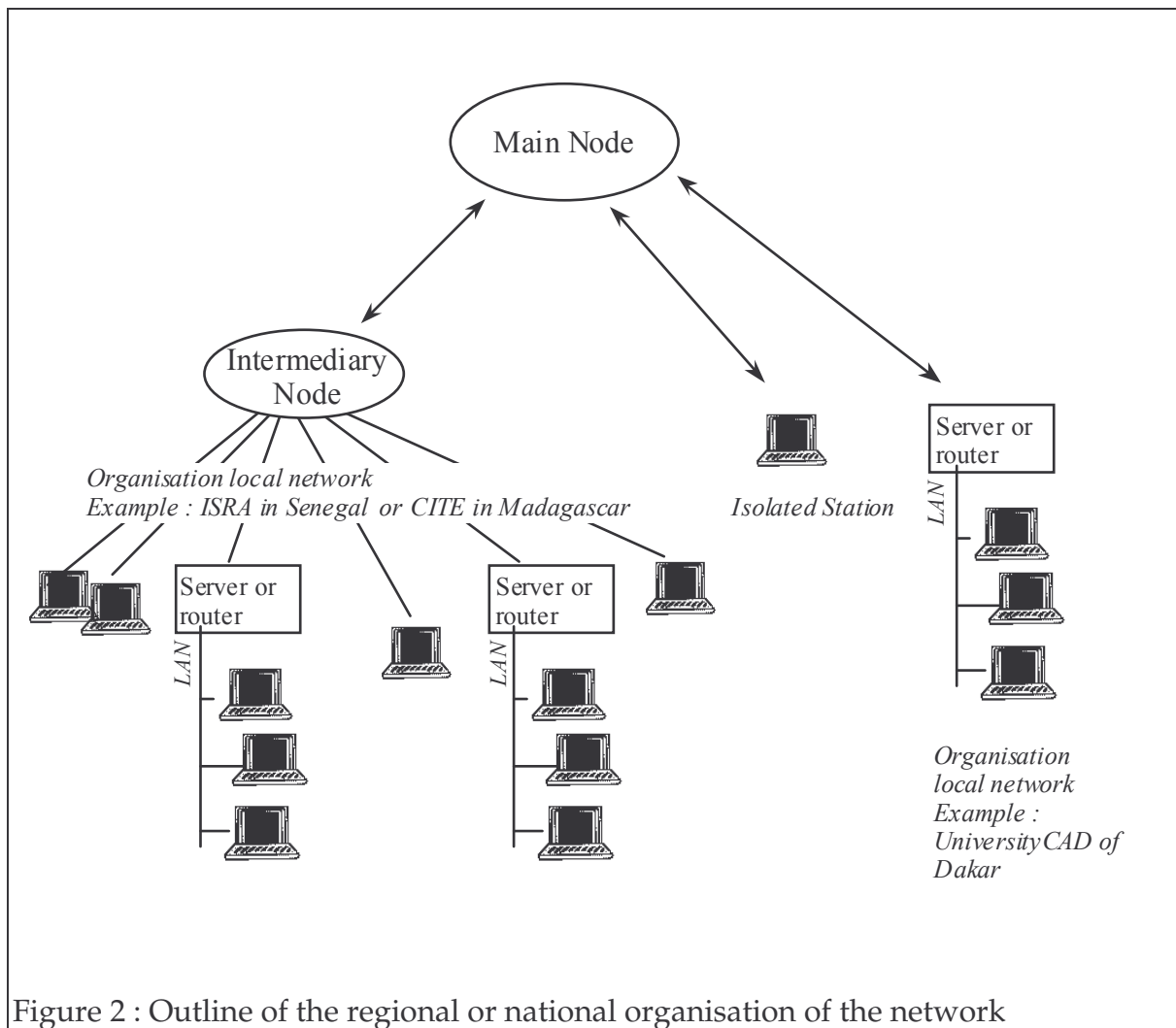
Figure 2 : Outline of the regional or national organisation of the network

1.4. Organisations in human health and breeding already linked to Internet by the RIO project

- ### International cooperation organisations

CIRAD   Centre International de Recherche en Agronomie pour le Développement
FPH   NGO : Fondation pour le Progrès de l'Homme,
UNITAR   United Nations Institute for Training And Research
FAO-SMIAR   United Nations, Food and Agriculture Organization
Institut Pasteur : Fondation international de recherche médicale
IMEA   Institut de Médecine et d'épidémiologie African (Paris)
AIRE   Agence pour l'Investissement dans la Recherche à l'Etranger
Banque Mondiale - Programme P.H.N. (Population health nutrition)
BDPA-SCETAGRI Conseil, expertise, ingénierie en agronomie

- ### Senegal

ISRA   Institut Senegalais de recherche Agricole (Dakar, Senegal)
UDAD   Université C.A.D. de Dakar
CORAF   Conférence des responsables de Recherche Agronomiques AFricains
PAN   Agence Pan-Africain d'Information (Institution spécialisée de l'OUA)
WARC   West African Research Center
IP   Institut Pasteur Dakar

- **Mali**

INRSP	Institut national de research en santé publique (Bamako)
CERPOD	Centre d'étude et de recherche sur la population et le développement (Bamako)
OMS/OCP	Programme de lutte contre l'Onchocercose
IER	Institut d'économie rurale
PNVA	Programme national de valorisation agricole
CNRST	Centre national de recherche scientifique et technique

ENDA Tiers Monde

- **Burkina-Faso**

ARTS	Agriculture Research and Training Support project (Ouagadougou)
CECI	Centre Canadien d'Etude et de Coopération Internationale (Ouagadougou)
ACDI	Agence canadienne de développement international - Ambassade du Canada au Burkina-Faso
UERD	Unité d'Etudes et de Recherches démographiques (Ouagadougou)
CEDRES	Centre d'étude de documentation et de recherches économiques et sociale
PROMACO	Projet de marketing social des condoms

VOISINS MONDIAUX - NGO
SAVE THE CHILDREN - Fondation pour le développement Communautaire - USA
OX-FAMILY UK

- **Cameroon**

Université	Yaoundé 2
OCCGE	Organisme de Coopération et de Coordination pour la lutte contre les Grandes Endémies en Afrique centrale

Centre Pasteur

- **Niger**

SEAG	Innovation et réseaux pour le développement (Niamey - Niger)
CERMES	Centre de research sur les méningites et les Schistosomiases
IRED	Institut de recherche et d'étude démgraphique
DAI	Development Aternatives Inc (NGO)

- **Côte d'Ivoire**

IPR	Institut de recherches médicales Pierre Richet (Bouaké)
OMS	Station d'Odienné /Programme d'Onchocercose pour l'Afrique de l'Ouest

- **Madagascar**

ENDA Tiers Monde
PNUD Madagascar : Programme des nations unies pour le développement
UNESCO
UNICEF

- **Togo**

URD	Unité de Recherche Démographique (Université du Bénin - Lomé - Togo)

1.5. Use of electronic mail in the field of health

The biggest group of diseases, in terms of morbidity and mortality, in developing countries in the intertropical region is *infectious diseases transmitted by vectors*.. Several of these diseases are to be found in both humans and animals. Others, while being specific to carriers, are studied by the same men and with the same techniques, and treatments are similar. This situation justifies the regrouping of human and animal health activities.
Those countries concerned are Senegal, Mali, Côte d'Ivoire, Burkina Faso, Niger, Cameroon.

In these countries, the network is principally based on foreign research structures based permanently in the country. These tend, by their very nature, to have closer ties with their home country or with the international scientific community than with national structures.

The network develops from individual requests from users working in these research structures as well as from requests from cooperation agencies or regional structures. It is mainly used for individual exchanges (scientific discussions or solving of logistical problems) and to circulate general scientific or administrative information. Most of these exchanges take place between the North and South. Information exchanges between individuals working in different African countries remain limited. These working and communication styles are progressively changing, as shown by the doubling in each of the last five years of the volume of information exchanged.

2. Prospects of development for a health network in French-speaking Africa

2.1. - Constraints

The main constraints are of a human nature. The need to communicate is neither easy nor usual for all those actors working in the field of health. There are strong traditional divisions between the different structures concerned : care structures, administrative structures in ministries, university structures and research structures.

For some, the computer remains difficult to understand, technically complicated and particularly fragile in hot and dusty areas. It requires typing skills, is not always able to communicate in writing those nuances of the spoken word, and finally it is not as long-lasting as the written word.

To be efficient, the connexion of specialists in the same field or in complementary fields requires reciprocal knowledge of both the individuals and working conditions: the opinion of a European cardiologist to an African counterpart is worthless if it does not take into account the technical level of facilities available where the patient is ; the opinion of an African doctor or vet to a European counterpart must consider

the enormous difference in requests for care between these two continents.

The progressive development of the network(s) requires only limited technical means (computers often already available, modem cards, links through the telecommunications network which are generally good enough for low-speed transfers).

The cost of the communications, higher within Africa and from Africa towards Europe than between Europe and North America, is sometimes a problem to be taken into account. Price reductions are, however, likely in the long-term.

2.2. - Reasons to develop telematic communications

The telematic tool can encourage :

- access to regional resource centres, capable of providing information directly or of organising access to the major international databases;

- scientific discussion between specialists in the same discipline or in complementary fields (medicine, hospital management), or simply exchanges between scientists;

- information exchanges between the North and South : the opinion of practitioners in the South would often be useful to their counterparts in developed countries...

- the decompartmentalization between neighbouring countries with different colonial pasts and separated by different working languages. Written communication in different languages is often easier than spoken communication, and less susceptible to misunderstanding : English-speakers, Portugese-speakers and French-speakers could thus get to know each other better by direct contacts. Information exchanges on a regional basis are one of the principal objectives. These exchanges today are slow, rare and often only happen during meetings in the South or more frequently in the North. Those managing a cholera epidemic in a country would benefit from the recent experience of a neighbouring country, more than from the opinion of specialists from the North who are often limited to their distant memories of a changing Africa.

The interest of the network is to encourage the development of communications on a regional level, namely between different areas of the same region. This could greatly improve exchanges between actors in the health field in different countries who are often confronted with similar problems.

Besides the availability of a new tool, the aim is the suitability of the network for its users to help with the emergence of "poles of excellence" going beyond national divisions. This network must favour exchanges of information and reflections, to develop a science of health in tropical countries originating from its actors.

The ideal would be to develop, by electronic mail, one or several specialised networks regrouping health management structures, hospitals and universities; to

organise twinning agreements between hospitals in the North and those in the South and between African universities and European Tropical Medicine Institutes.

2.3. - The actors of Health and the structures concerned

The experience acquired by RIO in Africa allows us to consider the progressive extension of the network to :

- decision-making structures of ministries responsible for human and animal health ;
- public health managers ;
- managers of large hospitals ;
- all health research structures based in these countries ;
- directors of studies in Health Studies universities ;
- European Tropical Medicine Institutes ;
- non-governmental organisations working internationally ;
- mutualistic-type structures to spread the risks of disease.

The situation in Burkina Faso illustrates the momentum which can be created. The bringing together in this country of a large number of inhabitants skilled in the field of computers, the holding of a big symposium (CARI) in October 1994, the solidity of the administrative structures and the presence at the Health ministry of several high-level managers have all combined to make possible the introduction of the telematic tool in the near future.

2.4. - The possible role of Orstom

"Pioneers" convinced of its interest are at the beginning responsible for the development of the telematic tool. These pioneers can progressively identify those individuals and structures concerned by information exchanges, and demonstrate the simplicity and low cost of the technique and the reciprocal advantages of frequent exchanges of information.

Orstom has the advantage, through its longstanding and permanent implantation and its continuity in these research fields, of being well-placed to identify some of these pioneers. The close relationships between Orstom personnel and national structures should be used to help the most go-ahead amongst them. Telematics is one of the instruments for the emergence of scientific capacities or of their management at a national but above all regional level.

2.5. - The role of European structures

The European Union, through its management policy favouring its cooperation activities, can allow the purchasing of telecommunications material where this proves necessary and aid the training of well-known "pioneers", the financing of the initial running of the network and the covering of the financial costs of a project coordinator.

Material needs, in computing or telematic terms, are relatively limited.

The costs of using the telecommunications networks are not negligible. Initial backing can be envisaged for structures with low income, without this being completely free. The financial participation of users is the best evidence of interest in the tool.

A project coordinator would at the beginning play a vital role in the extension of the network and in its developing suitability to African structures. This coordinator must be a health professional with competent computing skills and solid knowledge of situations in Africa, of its structures and of those responsible for managing them.

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