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Abstract

Since the mid 80s the cooperation between universities and research centres lead to the creation of the portuguese academic and research network. It was also in this period that some kind of formal cooperation with the other european academic and research networks has been initiated.

By the end of 1996 and under the portuguese initiative for the information society the academic and research network has been extended to include a larger community of the relevant institutions in education, research and culture. This led to the creation of RCTS a network that promotes the rapid implantation of the information society in Portugal.

1. INTRODUCTION

In the framework of the portuguese initiative for the information society it has been identified that it was very important to improve the use of information technologies and specifically the Internet by the portuguese academic, research and educational communities. To accomplish this goal the government decided to commit the organization that runs the portuguese academic network to design and operate a new network named RCTS (Rede Ciência, Tecnologia e Sociedade – Science, Technology and Society Network).

The RCTS network has as main objectives to improve the communications means of the following kinds of institutions:

- ♦ Universities
- ♦ Polytechnics
- ♦ Public Research Laboratories
- ♦ Private Non-profit making research institutes
- ♦ Elementary and secondary schools
- ♦ Public Libraries

In additional to the connectivity aspects the network should try to devise a model where an effective

cooperation among these institutions could be put into practice.

2. THE NETWORK INFRASTRUCTURE

The portuguese academic and research network has initiated its activities in the early 80s with an informal cooperation between several institutions, namely universities and a few private non-profit R&D institutes.

Around 1990 FCCN, upon a request from universities, had the task of leading the development of the academic and research network. During the coming years the network has developed and was built using leased lines.

By the end of 1996 and due to the increased use of the network, the government decided to increase the level of funding of FCCN in order to improve the quality of service provided by RCCN.

During 1997 there was a full migration of RCCN to greater bandwidth. The access bandwidth of universities has been upgraded to speeds between 1.4 Mbps and 10 Mbps, depending on the size and needs of the corresponding university. At present the network has the topology shown in Fig.1.

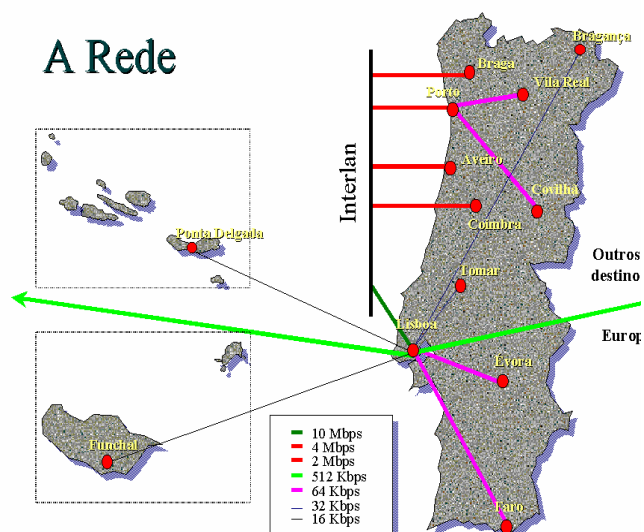


Fig.1 – RCCN main circuits

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The network is mainly based on the InterLAN service of Portugal Telecom a broadband network that uses DQDB and ATM as base technologies.

4. Extension of RCCN to Schools and Libraries – RCTS

The new paradigms imposed by the information society require new skills and the capacity of learning along all the life. Indeed it is frequently recognised that many of the technologies that we shall use during our professional life have not yet been invented. Because of these the students must be prepared for a new reality: life long learning. In addition to the traditional teaching, the school must prepare the students to the new sources of information made available by the new information and communication technologies. At present the capabilities of multimedia and also the Internet are two realities that a student cannot ignore.

It is taking into consideration these aspects that it has been decided to connect all portuguese school and all public libraries to the Internet and equip them with multimedia computers (see at <http://www.missao-si.mct.pt> the goals defined in The Portuguese Paper for the Information Society). The goals to be achieved until mid 1998 where the following:

- connect all portuguese secondary schools to the Internet and equip all schools libraries with a multimedia computer
- connect all public libraries of municipalities to the Internet and equip them with a multimedia computer

In order to achieve this goal it has also been identified that a special cooperation between the above entities and universities and research centres should be created, to motivate a stronger cooperation between the research and high level education system in the country and the schools and libraries.

In this context the schools and libraries have been connect using the academic and research network.

The task of connecting all schools and libraries to the Internet is quite large since it represents a significant technical challenge and also a major organisational effort. It also implies significant investments that must be carefully planned. In addition the educational aspects in schools are a key factor in the whole process since many teachers lack specific training in the areas of new

technologies and in most schools there is not relevant expertise in networking technologies.

Taking into consideration these aspects, namely the different development levels of schools and the need to control the technical and financial aspects of the overall project, it has been decided to adopt the following guidelines:

- In schools where there is already some activity in the area (around 15% of schools already had local area networks) this project should provide a good connectivity component
- In schools where nothing existed (or existed limited activity) a special strategy had to be devised in order to try to maximise the rate of success of the project providing them with a good platform to motivate the school to the benefits of information technologies
- The opportunity to connect schools to the Internet should also be used to open the schools to the new realities, namely the new media and the source of knowledge that they can bring

To achieve these objectives it has been decided to implement the project according the following general guideline:

Install in the school library or in the public library a multimedia computer with two network connections. These two network connections have specific and important roles that must be emphasised:

- One ISDN controller provides a connection to a scholar PoP (Point of Presence) using an ISDN line installed in the school library
- One Ethernet controller provides a connection to the school local area network (in existence or to be created in the future)

Thus the multimedia computer has multiple functions: a) can be used as a multimedia Internet workstation opening the school library to the new frontiers of multimedia either on CD-ROM or via the world-wide Internet; b) act as a router between the local area network of the school and the Internet.

With this strategy we have a solution that can be tuned to the specific needs of the school communities along the country and, at the same time, provides a path for future migration.

