DEVELOPMENT OF HYPERTEXT APPLICATIONS IN ALBANIA

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ABSTRACT

There are 24 years of computer story in Albania, and 10 years of networking. But UNIX systems and internet-like networks were introduced in only these last years. Actually there is no connectivity with Internet. The introduction of hypertext technology happened in the framework of COPERNICUS programme where INIMA is involved. Hypertext databases are in creation, followed by attempts to realise the connectivity with Internet and to begin with Internet services in Albania.

1 FIRST STEPS OF COMPUTER SCIENCE IN ALBANIA

The story of Computer Science in Albania began in 1971 with the creation of a small Centre of Mathematical Calculus, equipped with two transistor-based Chinese computers. It was an important event for Albanian scientific community living in a small isolated Balkanic country of 2 million inhabitants (3.5 today). A team of young people was trained in China to run the computers and develop programming of applied mathematical methods.

The team of Centre worked hard to open the way for the application of mathematical methods in different fields of human activity; and in sectors as geology, energetic, statistics there were good results. Gradually people began to accept the role of computers, some courses for programming languages were opened at the University and some training abroad was achieved. But the main focus was the Applied Mathematics. Operating systems and networking were almost unknown - the work was based only on ALGOL60 programming language.

The results of the work done by different specialists, the processing of data for the general registration of population (carried out with these old computers and perforated tapes in 1979), the apparition of small/micro computers and of new ideas on networks and data bases, the attraction of computers used in management, the introduction of mathematicians in some big enterprises - all these events created the conditions for the Government to accept the role of informatics in society and to give the "green light" for a project funded by UNDP to create a computer network in the capital city of Tirana.

The project was prepared carefully [BUKUROSHI 85] from the technical point of view, but the political factors had their important role too. At last in 1985 the network was operational, the old Centre was transformed in Institute of Informatics and Applied Mathematics and also the Chair of Informatics was created in the University of Tirana.

The network had a star topology with two mainframes at the centre and three minicomputers at the nodes of the "backbone". The technology used was proprietary BULL HN (DPS7 mainframes and DPS6 minicomputers, DSA networking protocols) and the role of communication infrastructure was just to connect about 50 ASCII terminals, distributed in some Ministries, University and scientific institutes, with the mainframes, including file transfer between intelligent nodes.

The network was used intensively during 1985-90, mainly for scientific and engineering problems (as finite element methods, migration of seismic data or a second registration of population in 1988). Except the statistics, the applications in economy and management practically "failed" because of factors outside scientific community. The network was used only for remote login and some rare file transfers. In such situation Albania entered in the years 90 - with a rich experience using computers, but without any practice concerning distributed internet networking concepts and Unix environments. As for the international connectivity, it remained as a "future perspective".

The first experience with Unix at INIMA was in 1989, when a stand-alone graphic HP workstation was introduced. At the same time a VAX system was introduced at the Chair of Informatics in University, always with only a number of local terminals. But at last the first tests were carried out by the Chair of Informatics for dial-up communication with the University of Pisa, Italy. These tests continued only for a short time because of telecommunication problems.

Only in 1993 the team of INIMA began the installation of a LAN supported firstly by a Bull HN DPX Unix server and TCP/IP protocol. In 1994 the LAN was fully extended, a big HP Unix file server was installed, regular dial-up communication

was established with SARITEL in Roma and also with the University of Pisa, Italy. With these events we had the first contacts with Internet and internet services, including hypertext technology and WWW. Some similar steps were done also by one or two private companies in Albania (mainly for internal purposes).

The decisive factor for the first real step towards Internet services was the involvement of INIMA in a project of programme COPERNICUS, named ETCETERA (East-West Technical Cooperation in the Research and Development of Electronic Trading), with the aim to create between the countries of European Community and those of Central and East Europe an Internet service for business activities. One of main objectives is to create hypertext distributed databases with economical and other information.

2 CREATION THE FIRST HYPERTEXT DATABASE.

Five organisations participate in ETCETERA, OCTACON (UK), SARITEL (Italy), AEIIE (Poland), ICCS (Bulgaria) and INIMA (Albania). The five partners are creating their own databases following the same methodology but having local specifics each of them.

The project may help Albania in three important directions:

- To gain some concrete experience with internet services in isolated environment.
- To implement abroad, in hosts of OCTACON and SARITEL, hypertext databases integrated in WWW with information about Albania and its economy.
- To have an isolated but important hypertext database for economical information that would help to increase the interest on Internet services and to create the conditions to establish a permanent connection with Internet.

INIMA based its work in three main points:

- The fact that Albanian economy in fast transformation, having an important number of private SME with unstable activities.
- In Albania there is no experience in Internet services including hypertext.
- Albania is not connected with Internet, without mentioning dial-up 2400 bps connections.

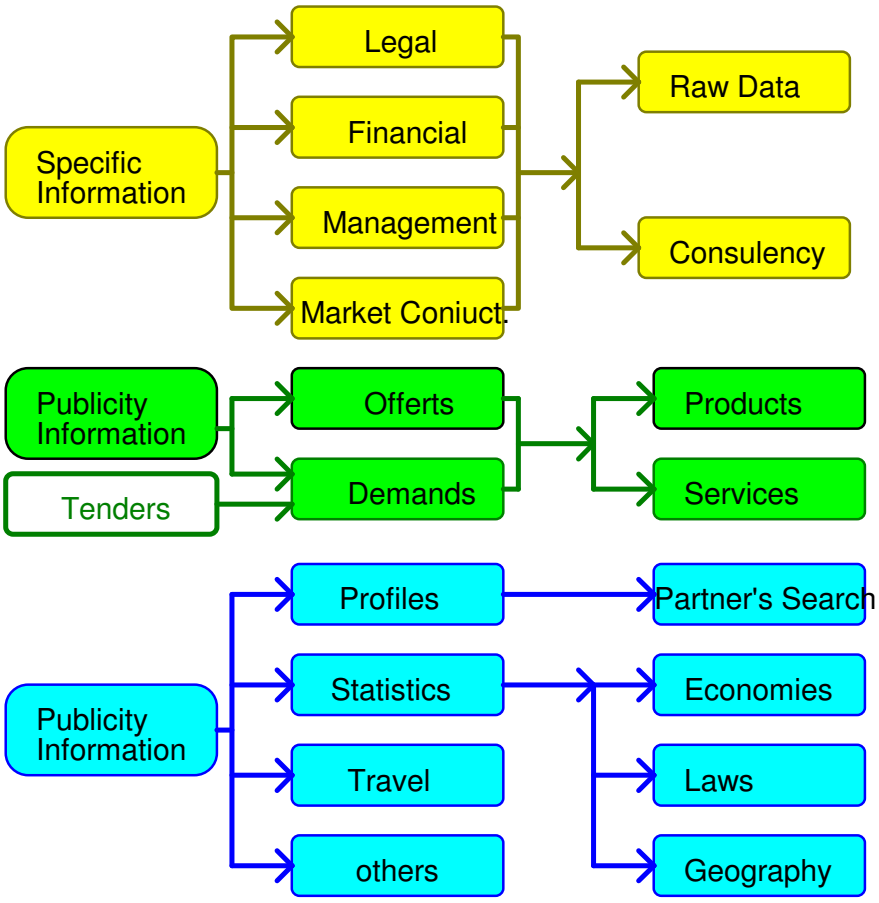

Fig. 1, The Structure of Services/Information, Project ETCETERA.

The structure of different services [ETCETERA 94] considered as with interest for Albanian enterprises is shown in Fig.1. Based in this structure, the database is designed to permit end-users to navigate as easily as possible inside a big set of all kind of information including legislation, description of enterprises and also of agencies involved in economical activities as Chamber of Commerce, description of different products/services offered or demanded by Albanian enterprises, general purpose information as statistics, geographical data, and of course touristic and travel data. To achieve this objective we designed a "inter-linked" tree topology for HTML pages [ETCETERA 95] as in the Fig.2.

The complexity of a such database is quite obvious. The problem becomes more complicated because of the necessity to integrate distributed databases in one unique Web where the end-users, mainly managers and specialists of business, may navigate and may find easily the needed information. It would be important

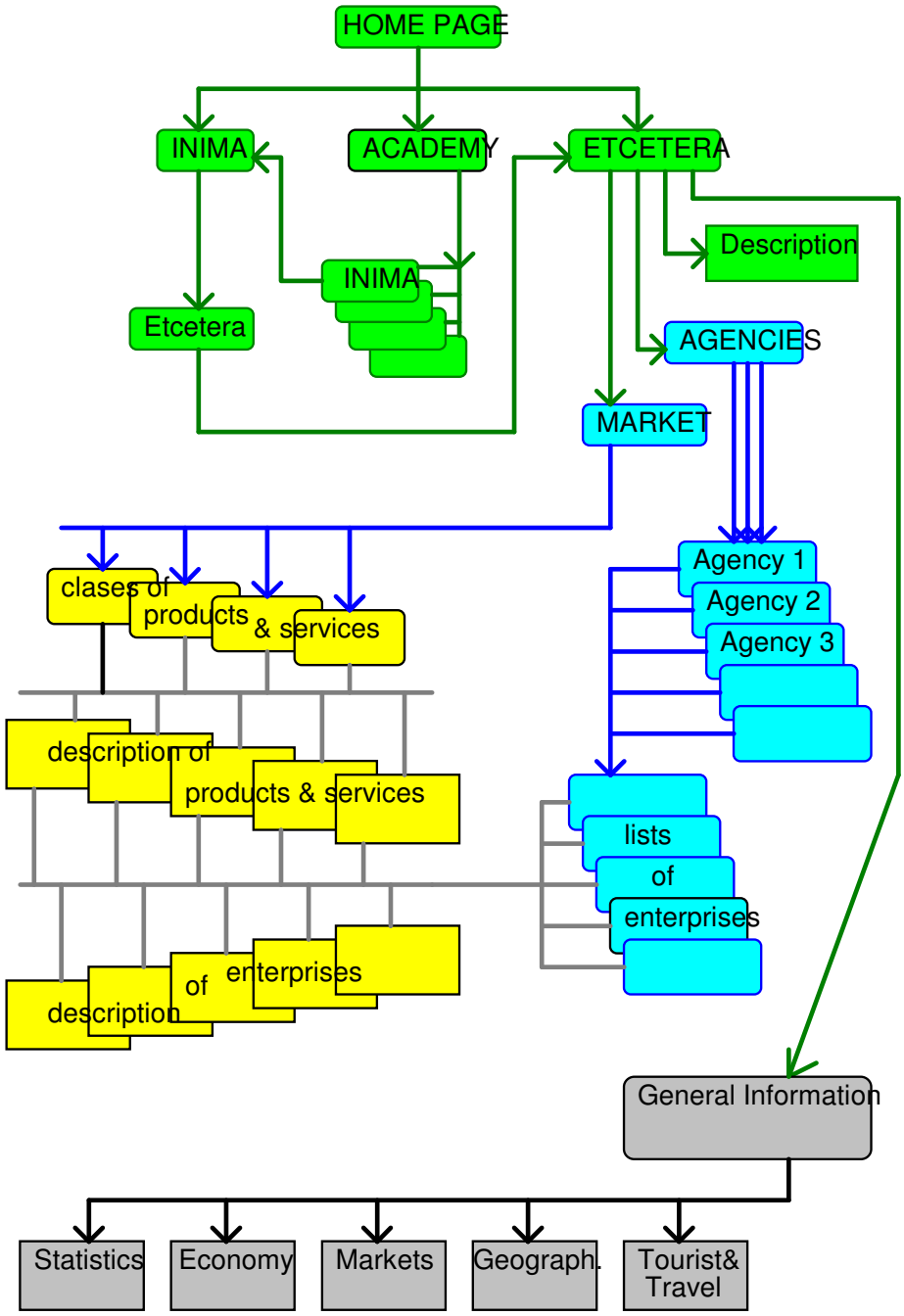

Fig. 2, The Structure of HyperText Database, Project ETCETERA.

also to integrate this Web with other database systems outside ETCETERA "environment". To achieve this last objective we are going to study and implement interfaces between HTML and non HTML databases.

The main problem remains the indexing and searching with key words in a distributed Internet environment. The complexity of this problem was the main pushing factor to prepare a second project in the framework of COPERNICUS, i.e. HANNIBAL (HyperAgent Network Navigation for Implementing Business Acceleration and Liaison) as a continuation of ETCETERA. A new partner, SINTA (Romania) is added in this second project.

3 CONCLUSION

The conditions for Internet services in Albania are not quite optimal. Except the internal connectivity inside some institutions (i.e. LANs) that are in a good level, the MAN telecommunication infrastructure is "sleeping" or absent. Remote connections are carried out by using dial-up connections with 2400 bps only, including connection with Internet. Taking into account the fast development of Internet and its use for commercial purposes as well [BANGEMMAN 94], we cannot wait to solve firstly telecommunication problems and later to begin with Internet services. Supported by COPERNICUS programme of CE we are working to create the first hypertext database for economical information, and at the same time we are trying to realise the connectivity with Internet.

4 REFERENCES

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