NETWORKED INFORMATION IN TURKEY

by

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A Brief History of Networking in Turkey

Computer networks have been in use for more than two decades. Yet, the proliferation and widespread use of networks is a relatively new phenomenon. For instance, the number of networks connected to the Internet, the major research and education network, grew from "164 domestic and 9 foreign networks in July 1988 to 4,112 domestic and 2,273 foreign networks in Aug. 1992." It is estimated that the number of hosts connected to the Internet is close to one million and more than a thousand new hosts join the Internet every day (Press, 1992, pp.21-22).

Parallel with the growing global interest in networking, the initial networking projects in Turkey have begun in the second half of 1980s. Undoubtedly, these earlier attempts were closely associated with the developments in telecommunication services in Turkey which has been progressed enormously in recent years. The first Turkish network was set up in 1986 among universities and research institutions. TÜVAKA (Turkish Network of Universities and Research Institutes) is being administered by a committee which includes a representative from each participating organization (Kurbano_lu, 1991).

In October 1986 TÜVAKA was connected to EARN (European Academic and Research Network) via Pisa in Italy (Tonta, 1990). As is well known, EARN is a computer network to create a sufficient infrastructure for communications between universities and academic research institutions in Europe and it has connections to other similar networks around the world such as BITNET. The TÜVAKA's EARN connection enabled Turkish universities to communicate with both European and American academic and research institutes.

The structure, principles and technology of BITNET, the American counterpart of EARN, were taken as a model for TÜVAKA. Like BITNET, TÜVAKA is open to all universities and non-commercial research institutes and the data transmission is provided free of charge and free of constrains (Çelik, 1990).

In the beginning twelve universities including the major ones such as Istanbul, Ankara, the Middle East Technical (METU), and Bosphorus Universities, and TÜB_TAK (Turkish Scientific and Technical Research Council) joined TÜVAKA. Aegean University was connected to TÜVAKA as an international node through which the EARN connection was provided. In addition to Aegean, Yýldýz and Anatolia Universities also became the main nodes (Manas, 1987). These three nodes constitute, geographically, the back bone of the TÜVAKA network. All other participants are connected to the system via these three main nodes.

The number of participants and new applicants are growing rapidly. There has been a great demand not only from newly founded universities but also from some industrial and governmental research institutions. As of November 1992, 30 universities and research institutes are connected to TÜVAKA (thus to BITNET). An overwhelming majority of TÜVAKA members are the universities. Some universities (e.g., Aegean, Anatolia, METU, Yýldýz) have more than one BITNET connections. The Higher Education Council (HEC) and four other research institutes including TÜB_TAK Information Technology Center are also on the BITNET.

As of this writing (January 1993), TÜVAKA is not connected to the Internet yet. Studies and tests with respect to the TCP/IP (Transmission Control Protocol/Internet Protocol) connection have been going on since last year and it is highly likely that the Turkish university and research network will soon be connected to the Internet. (Five universities within the country (Aegean, Bilkent, Istanbul Technical, METU and Y_ld_z) have TCP/IP connections and they can communicate among themselves trough TCP/IP. Yet they cannot use the existing Internet services such as telnet and ftp so as to get access to the other Internet nodes outside the country.)

Network Services

Various network services are offered by TÜVAKA. For instance, network users are able to send and receive email (electronic mail) messages and files over the network, get access to computer conferences through LISTSERV, and query remote databases and library catalogs. These services are briefly explained below.

Electronic Mail

From the very beginning, email facilities were made available to the TÜVAKA users. Yet email has yet to be the prevailing communication medium within the Turkish academic and scientific community. Somewhat limited access to computer resources and the general level of computer literacy prevented most users from becoming acquainted with email services in the beginning. The email traffic in Turkey has shown a tremendous increase in recent years. Consequently, users started to question the efficiency of the email service through some computer conferences. Several messages have been posted in DOST (a computer conference for Turkish scientists) about, among others, lost messages, slow delivery, and the lack of acknowledgement for

undeliverable messages. It is believed that some of these problems can be alleviated to a certain extent once the Turkish network is connected to the Internet.

Computer Conferences

Through TÜVAKA, users can get access to computer conferences available on BITNET and Internet. There are more than 20 computer conferences on BITNET initiated by the Turkish hosts which are members of TÜVAKA. All Turkish conferences are accessible through LISTSERVers located in three universities (Aegean, Istanbul Technical, and METU). A wide variety of topics are being discussed on these mostly unmoderated conferences ranging from general science (DOST@TREARN) to libraries (KUTUP-L@TRMETU), from commentaries (SENFONI@TREARN) to Turkish stock exchange (BORSA-L@TREARN), and from poetry (SIIR-L@TRITU) to natural language processing on the Turkish language (BILDIL@TRMETU) (Kömür and Özden, 1992). Postings to conferences are usually in Turkish or English. Some conferences are more active than the others. Our review of membership lists indicates that close to 3,000 users are registered in Turkish computer conferences. As should be expected, not all registered users are Turkish and membership lists may overlap to some extent.

Access to Library Catalogs and Information Services

Several Turkish university libraries are in the process of automating their housekeeping activities. Yet a few of them have actually begun converting their card catalogs into computer-based catalogs. Catalogs of Anatolian (KYBELE@TRANAVM2), Bilkent (BLISSNET@TRBILUN), Euphrates (FIRATLIB@TRFIRAT), and Mediterranean (AKSEA@TRAKDEN) university libraries can also be queried through the network. In addition, the Higher Education Council Documentation Center has an email library service (YOKDOK@TRYOK) (Ar_nç *et al.*, 1992). Users can send their photocopy and Dialog online search requests to the Center through the service and interrogate its database of periodical titles (circa 13,000 titles) and Turkish dissertations. The documentation center of the Turkish Scientific and Technical Research Center also has a similar service (TURDOK@TRTETM).

The number of records available for searching seems to be rather limited and the figure is not given in most cases. For instance, the catalog of the Anatolian University Library (KYBELE) contains the bibliographic records of about 12,000 monographs and theses, over 2,500 journal articles and 269 periodicals (January 1993). This is likely to change in the near future as libraries complete the retrospective conversion of the older records in card catalogs.

As yet, catalog searches cannot be performed interactively. The message (or file) containing the search queries can be submitted to the system through email. The results of the search are also sent back to the user as an email message. This is rather limiting in that users are not able to perform their searches online and revise their queries

interactively, which is primarily due to the fact that BITNET has no telnet or remote logon facilities.

Catalogs that are available on the TÜVAKA network can be searched using a variety of access points such as author, title and subject. In addition, Boolean operators AND, OR, and NOT can also be used. The retrieved records can be displayed in default or long format. However, the query syntax may quickly get complicated as the search query gets longer requiring multiple lines. Typographical errors, for instance, can cause the whole query to fail because queries are submitted as email messages or files. If this is the case, users first would have to wait in a non-interactive environment for the results, discover that they made a mistake (e.g., syntax error), and then re-submit the corrected query.

Besides some technical problems related to the telecommunication infrastructure, there are several other problems related to non-ASCII Turkish characters (Ç, ç,Ý,ý, Þ, þ, Ö, ö, Ð, ð, Ü and ü). The location of the non-ASCII Turkish characters in different computer keyboards varies. This causes a difference between input and output for the same Turkish text keyed in via different computer keyboards.

A similar problem occurs when entering search queries and displaying the results. Search queries containing Turkish characters must be converted to their closest equivalents in ASCII (i.e., "ç" to "c" or "ö" to "o"). In order to alert the computer to the incoming Turkish character, usually a slash ("/") is used before the character, which further complicates the query syntax for some search queries. For instance, a subject search query for "SIÐIR YETÝÞTÝRÝCÝLÝÐÝ" (cattle breeding) must be submitted to the Mediterranean University library catalog as "QUERY: SI/GIR YET/I/ST/IR/IC/IL/I/G/I"! This is an error-prone process in that users always have to keep in mind as to whether each and every character to be entered is unique to Turkish and not included in the English alphabet. This would increase their mental loads tremendously. Besides, it may not always be clear to the users why it is that they should be involved in this conversion process.

As should be expected, syntactic rules for creating search queries also vary from one catalog to the other. Every time they attempt to use a new catalog or an information service, users have to learn a new query language with a different set of commands and rules, which is likely to prove inconvenient as the use of catalogs on the networks increases in time. The problem is not new in that designers of online catalogs and information retrieval services in the United States and Europe have long been working on common command languages and the Z39.50 computer-to-computer information retrieval protocol.

There have been similar attempts to standardize the query languages used to search the library catalogs that are available on the Turkish network. Some issues regarding the development of a common query language have been discussed in 1991 in KUTUP-L, a computer conference for Turkish librarians (Tonta, 1991; Aslan, 1991). However, most

people who developed query languages for their own library catalogs seemed reluctant to partake in discussions on the development of such a common query language for all library catalogs.

In 1991 the executive board of TÜVAKA agreed to the establishment of a reference query language for information retrieval services operating on TÜVAKA. Same year the TÜB_TAK and the Bilkent University began a joint project to address and resolve data retrieval problems presented by the Turkish language and to establish a reference query language. They developed a model application using the reference query language which consisted of the network interface and the BRS interface modules. The model application they developed can operate in either batch or interactive modes and search queries can be issued in Turkish or English (Koçberber *et al*., 1992).

In our view, the development of a common query language for all Turkish library catalogs merits further consideration. As the majority of Turkish libraries are at present in the process of developing computer-based catalogs, it might be much easier to agree on a standard search query language right from the beginning.

Other Services

In addition to library catalogs, Turkish network users can query some databases available for public use. For instance, EARN provides a service called ASTRA which facilitates access to several databases on EARN and BITNET networks (ASTRADB@TREARN). Similarly, users can search the archives of various computer conferences available on the network using the commands provided by the LISTSERV software and transfer files from NETLIB. File transfer services such as TRICKLE (TRICKLE@TREARN) are also available. A few universities set up servers through which some useful files can be transferred (i.e., BILSERV@TRBILUN and COMPCLUB@TRITU). Netnews is made available through Aegean, Istanbul Technical, and METU universities (NETNEWS@TREARN, NETNEWS@TRITU, and NETNEWS@TRMETU, respectively). Users can submit queries regarding network services to a specific computer conference (DANISMAN@TRITU) and to a question bank (SORUBANK@TREARN). Email addresses of the Turkish network users can be obtained through a similar service (IDSERVE@TRITU).

All the services mentioned above are available through email messages. Users have to send in their queries as either email messages or files that contain structured search queries (i.e., not real-time and interactive). In other words, users cannot remote logon to other computers, query databases online, ftp to other sites and transfer files, etc. because telnet and ftp services are not available on BITNET. There is a BITNET server called BITFTP that allows BITNET sites to use the Internet's ftp (File Transfer Protocol) to send/receive files to ftpable Internet sites. Yet the access method is not interactive. (Note, however, that, as mentioned earlier, five Turkish universities having TCP/IP connections can use telnet and ftp among them even though they cannot telnet or ftp to Internet sites outside the country.)

Conclusion

There have been a number of important developments with regard to networking in Turkey in recent years. Among them are the implementation of ISDN (Integrated Services Digital Network) by the Turkish PTT and the implementation of the first fiber-optic campus-wide network by METU (Ak_no_lu, 1991; `Türkiye'nin…', 1990). Also, an International Computer Institute with super computing facilities is being established within the Aegean University. One of the main objectives of the new Institute is to form a center so as to set up two networks: BlackSeaNet among the Black Sea countries (which would include the newly-founded Turkic Republics of the former U.S.S.R.), and IslamNet among the islamic countries such as Iran and Pakistan (Manas, 1992). Scholars and researchers in the newly-founded Turkic Republics and Islamic countries are the potential users of the Turkish network.

As our brief review shows, there is a great demand for network services in Turkey not only from newly-founded universities but also from some industrial and governmental research institutions. Although scholars and students at universities and research institutes constitute the overwhelming majority of Turkish network users, the situation would soon change as computers become more accessible and the level of computer literacy increases. Users are eager to use the network and frequently send questions to computer conferences asking the availability of certain information services. They demand TCP/IP connection and Internet access to online library catalogs and information services such as those offered by Dialog. Some academics wish to be able to telnet or remote logon to their accounts on computers in other countries and work interactively, which is impossible without a TCP/IP connection. The demand for network services is likely to multiply as and when professionals as well as secondary school students become network users gradually. Needless to say, the ever-increasing demand for network services can only be satisfied with an efficient telecommunication infrastructure. The Turkish PTT has been working very hard to keep up with the constantly growing network traffic.

Turkey is often seen as a bridge between the East and the West. It has recently become a member of the Western European Union (WEU). In view of the recent developments in the former U.S.S.R. and the establishment of sovereign nations, Turkey is likely to assume a more important role in the region and can become a networking hub among the Black Sea and Islamic countries with a sound telecommunication infrastructure. This would further facilitate the free flow of information between the East and the West and make Turkey a part of "European Information Community," which is obviously an essential step for becoming a part of EC.

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