Introduction, Online services – past and present in a Nordic and international perspective

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Nordic co-operation

Most of the authors of this volume have been following the development of online services for more than a quarter of a century and actively contributing to their development and usage in the Nordic countries. There is a long tradition in the co-operation of information services and libraries dating back at least to the 1950’ies. Nordic co-operation has been very fruitful in sharing experience and in establishing forefront information services in the Nordic countries.

Nordforsk, the Nordic co-operative for Applied Research established a committee for information and documentation in 1957. Several Nordic projects emerged from their work. One of the early projects dealing with computer-based information services was a data base evaluation in the early 1970’ies. Nordorsk initiated the Scannet project for establishing a packet-switching network for online information services in 1975. Nordforsk was a non-governmental organisation of research councils and academies of technical sciences in the Nordic Countries. Its work ended in 1987.

The Nordic Council of Ministers founded an organisation, Norddok for the co-operation of research libraries in 1970. This was followed by Nordinfo, the Nordic Council for Scientific Information, which was founded in 1976. Nordinfo financed several research and development projects related to online services. They continued to support database co-operation within Scannet. Later on, in the mid 1990’s they established three centres of excellence for contributing to the development of the library and information sector. The centres were the Nordic Centre of Excellence for Networked Information Services (or Nordic Net Center) located in Lyngby, Denmark which was a joint venture between Lund University Library in Sweden and the Technical Knowledge Centre and Library of Denmark (DTV), Nordic Centre of Excellence for Electronic Publishing located at Technical Research Centre of Finland (VTT) and Nordic Centre of Excellence for Digital Handling of National Library Collections located at the National Library in Norway. The work of Nordinfo ended in 2003.

Nordic users have been very active in taking into use computer-based information systems. This has also been proven in international surveys on online usage during many years. Nordic meetings are being arranged and users from the Nordic countries participate in international conferences for sharing experience and getting new information and ideas. The Nordic Information Conference, Nord-IoD jointly organised by the Associations for information services is being held every third year. It is obvious that online services have had an important part in the programme for a number of years.

The largest international online conference in the world, the Online Meeting in London attracts participants from a great number of countries. When counting the number of participants per country and proportioning it to the population statistics the number of Nordic participants has always been on the top (not including the local participants from UK). International associations such as FID, IFLA, IATUL and EUSIDIC as well as ICOLC have had a strong support from the Nordic countries.

Birth of bibliographic database services

Electronic publishing actually started when scientific secondary publishers took computers into use for producing printed abstract and index journals in the beginning of the 1960’ies. This was a necessity because of the so called information explosion, which was due to the boom of scientific research after the war. The state of the art of electronic data processing allowed bibliographic data elements to be inputted in machine readable form and to produce an output for photo-composition. As a by-product a magnetic tape file was obtained, which could be used for information retrieval by computer.
A leaflet advertising Chemical Titles, one of the first bibliographic databases available on magnetic tape.

Secondary publishers at that time were only interested in producing the databases and encouraged other information centres to run the search services for end-users. So, they leased the tapes to information centres, which then offered selective dissemination of information, SDI services to end users. American information providers such as Chemical Abstracts Service, National Medical Library, National Technical Information Service, Engineering Information and Institute for Scientific Information began to deliver bibliographic databases on magnetic tape in mid 1960’s.

Information centres in the Nordic countries were among the earliest users of the tapes. Bio-Medical Information Centre of the Karolinska Institute and the IDC-KTHB in Sweden and the Danish Technical Library started running SDI service in the middle of the 1960’ies. These services were used also in Finland. Later on, in the beginning of the 1970’ies two Finnish organisations, the Library of the Helsinki University of Technology and the Finnish Pulp and Paper Research Institute also acquired databases for SDI.

Bibliographic reference output on cards at the IDC-KTHB SDI service.

The number of databases grew rapidly as described in the following figure.
Growth of the number of databases based on the figures collected by Martha Williams and published in the Gale Directory of Databases.

Birth of online services

Owing to the development in mass storage and telecommunication technologies it became possible to hold large databases in direct access memories and access them by using remote terminals in the early 1970’s. Lockheed Missiles and Space and SDC Search Service in the US started marketing public online services. Packed-switching telecommunication networks, such as Tymnet and Telenet were extended from America to a number of European cities and it became possible to reach the American online systems in Europe.

An journal advertisement from the mid 1970’s of Lockheed Information Services.
The users in the Nordic countries were among the first in utilising these services. Nodes of the telecommunication networks had not been installed in the Nordic countries but the services could be reached by making a telephone call to the nodes in the Belgium, France or Switzerland. Later on other access points outside the Nordic countries also became available.
Online use at VTT Information Service in the early 1980’ies.

The first information retrieval network within Europe based on remote use of online systems was established by ESRO-ELDO, later known as the European Space Agency. Sweden was a member of the space organisation and the network was extended to IDC-KTHB in Stockholm. First the service was open only to dedicated terminals in information centres in the member countries. Later on it was made publicly available.

A brochure of IDC-KTHB from the 1970’ies advertising access to the ESRO-ELDO online system.

The number of online systems grew rapidly. Large, national online services were established in major European countries. These include Questel in France, Pergamon-Infoline in the UK, INKA and DIMDI in Germany and Data-Star in Switzerland. Users in the Nordic countries also took these services in use in addition to the major online hosts in the US. In addition to big online hosts with dozens of databases specialized services with small number of databases also emerged.
Growth of the number of online services. The graph is based on the figures by Martha Williams in Gale Directory of Databases.

In order to be able to offer comprehensive coverage for information needs to serious research and development projects it was and still is necessary to use several databases, which can be in different online systems. For an information specialist this requires thorough familiarization with a number of search languages and conventions used for compiling databases. Attempts were made to standardize the search language and a common command language, CCL was created. However, it was adapted only by a few European online hosts.

Manuals for online search systems and databases at VTT Information service in the 1980′ies. VTT Information Service had contracts with 60 different online hosts with more than 200 databases.
Evolution of packet-switching telecommunication networks for information services

The Commission of the European Communities had realised the importance of packet-switching telecommunication networks in information retrieval and founded the Euronet project in 1971. The network became operational in 1979. Of the Nordic countries Denmark was the only EEC member country. Sweden and Finland joined Euronet by special arrangement in 1982.

Nordforsk founded the Scannet project for establishing a packet-switching network for information services in 1975. The network became operational in 1976 with nodes in Copenhagen, Oslo, Gothenburg, Stockholm and Espoo in the greater Helsinki area.

A brochure for advertising SCANNET.

The Scannet node, a NORD 12 computer at the State Computer centre in Espoo in the 1980’ies.
A host computer with databases linked to Scannet at NSI, Norway

Later on both Euronet and Scannet were replaced by interconnection of national packet switching networks operated by the telecommunication authorities in the European countries. In the Nordic countries the networks were called Telepak (Sweden), Norpak (Norway) and Datapak (Finland). These networks offered access to American, European as well as to Nordic online services from the beginning of the 1980's.

Internet was developed in the United States the 1980'ies. The Nordic countries were among the most active in Europe for providing efficient network services for higher education. TCP/IP-based Nordunet was initiated as early as in 1985 extending the Internet to Scandinavia. According to published statistics the Nordic countries have been leading for many years as to the number of internet connections and of users.

The use of the Internet for distributing scientific papers and utilising its offering for information retrieval was attracted by researchers, librarians and information specialists in the Nordic countries already at a very early phase resulting a number of Gopher, WAIS and WWW services in the early 1990'ies.

Packet-switching telecommunication networks based on the X.25 standard and operated by the telecommunication authorities in the Nordic countries were gradually replaced by the Internet in accessing online services abroad. The change, however, did not happen immediately as the actual speed of the connection and quality of the network services were not good enough to justify its use owing to the relatively high hourly price paid for the access to the commercial online services. The reliability of the PTT networks was also poor in the early stages and caused a lot of concern among the online users. Special 'monitoring weeks' were arranged for reporting and conveying the message to the telecommunication authorities.

**Pricing and usage**

The rapid growth of the use of online services from the middle of the 1970'ies was very much due to the right pricing model chosen by the information providers. Charging for computer applications was earlier based on complex algorithms including the use of such resources as central processing units and the number of input-output operations. So, the cost of a computer session was hardly predictable by a user. In addition, there were initial fees and monthly fees for the use of a service.

Providers of bibliographic online services introduced a very clear pricing scheme included in a simple user agreement, no initial fee (or a very modest fee for the manuals) and no monthly fees. Charging for the service was based on the clock time at the terminal, where the hourly rate was dependent on the database used.

Later on, when the telecommunication speed in the X.25 networks was increased, the connect time model was not appropriate any more and it was gradually replaced by the “pricing for information” model, where the determining factor was the amount of information output from the database.

The pricing model based on actual usage was well received by industrial information service units and research establishments, which used to account for the costs on special projects. Academic libraries, however, were
accustomed to the subscription model and the reception of online services was not always enthusiastic. The situation changed when bibliographic databases became available on CD-ROM as the pricing was based on subscription or purchase. International databases on CD-ROM were well received in the Nordic countries, especially by university libraries. The databases on CD-ROM were networked at university libraries to large CD-ROM networks allowing comprehensive database availability within the libraries. Also a few Nordic databases were transferred to CD-ROM. Later on the CD-ROM networks were replaced first by servers and later on by access to publishers’ services.

In the early years of online the information providers outside the Nordic countries were concentrating on the market in their own countries and there were no presentation of the large international services. University libraries and information centres, especially in technical and medical field took the role of education and training. They hosted training courses inviting representatives of the online services and data base producers to come and explain search languages and data base structures for the end users. They also arranged training courses of their own. In addition, active online user groups were formed in each of the Nordic countries. They published news leaflets informing about new services and numerous new features in the systems under constant development.

The usage of online databases was monitored and measured in various projects in the Nordic countries and internationally. The studies show that the usage per capita in the Nordic countries has been very high.

**Access to primary documents**

The awareness of existing documents for satisfying information needs increased radically as literature references were distributed on the basis of SDI and online services. This created a new form of business called document delivery. In the US the university libraries were there for serving students and faculty mainly and had limited capacity for outside customers. Some librarians, who had insecure future in their career owing to the economic crisis in the early 1970’ies saw there a business opportunity and founded small companies called brokers to satisfy the need for documents. They hired “runners”, mostly students, who went to large university libraries for copying journal articles on demand.

This development did not take place in the Nordic countries. University and research libraries, especially at technical universities had a long tradition in serving outside customers. So, their collections and services, including interlibrary loan and document delivery from other libraries became important also among users at industry. Resources from other Nordic libraries were also used and the Nordic Union Catalogue of Periodicals, NOSP was an important tool for locating documents in the Nordic libraries. Scandoc, the Scandinavian Documentation Center, which had been established by Nordforsk in Washington DC already in 1960, was used for hard-to-find material from the US. Among the development projects supported by Nordinfo several were related to electronic document delivery.

A brochure for advertising SCANDOC.
Library automation systems offer locators to documents held in the libraries. The planning of larger scale library automation to include library routines such as acquisition, cataloguing and lending was started in the beginning of the 70’ies. The ALIS system for cataloguing holdings of the Danish Technical Library (DTB, Danmarks Tekniske Bibliotek) in Copenhagen was one of the first operational library automation system. Many specialists from other libraries in Scandinavia participated seminars arranged by DTB to familiarise themselves with the new possibilities offered by the use of ADB. LIBRIS was the automation system of the Swedish Royal Library (KB, Kungliga Biblioteket) in the 1970’ies, an ambitions project, the original goals of which could not be fully achieved with the technology and resources available at that time. In Finland the Ministry of Education decided to finance a common automation system for all 20 university libraries in the country. In Norway the library automation is being developed by BIBSYS. Currently more than 100 libraries are using their services.

Publishers started to offer primary scholarly journals in electronic form in the middle of the 1990’ies. The first services were based on the use of CD-ROM’s to deliver page images to be uploaded to the customer’s computers. Access to the publisher’s server became soon as an option. The services are now called electronic libraries. Electronic material can be primary journals, books or other documents such as patents or standards in electronic form. Bibliographic and other referral databases can also be included. The business model is leasing access for an annual fee.

In order to fully utilise the available offerings and to be able to afford the high prices involved, libraries formed consortia for negotiations with publishers. An idea of a Nordic consortium was put forward in some of the early contacts with publishers. The publishers, however, in their early phase of a new business were reluctant to include such a wide consortium in their agreements.

In addition to individual libraries signing contracts with publishers, a number of library consortia were formed in the Nordic countries. Large national licensing programs were also introduced. E.g. in Finland the Ministry of Education financed the service FinELib, the Finnish Electronic Library, for the university libraries. Libraries of the polytechnics and a number of research institutes also participate in FinELib with their own financial contribution. Copyright restrictions hamper delivery of individual journal articles. Journals are sold by annual subscriptions. Only recently some publishers have made the purchase of individual articles possible.

The constantly rising prise of journals both in printed and electronic form has led to new publishing models. The open access initiative encourages researches to publish via alternative channels. The number of open access journals is increasing, but still the well established scholarly journals by commercial publishers are the main publishing channel for scientific research.

**Online to-day**

Internet has made a great change in publishing and information searching. The free sites on the internet have become the most frequently used source of information in everyday life for all. In spite of the lack of sophisticated functionalities developed for the specialized search systems a rapid “googling” is enough for many information needs.

An important feature in today’s electronic sources is hypertext linking. It offers remarkable added value compared to printed publications. Links can be added between different parts of a document and especially between different documents. A link can be established from the list of references to the cited article, if that is available in electronic form or to a corresponding abstract in a bibliographic database and vice versa. An extensive link network between journal articles has been made by collaboration of publishers. Connections to library automation systems are also being development to allow retrieval of items in the subscribed electronic sources.

Documents can contain text, graphics and images in their layout. Also animation, sound and moving images can be added to presentations. In addition, it is also possible to include computer programs in electronic documents allowing users to run simulations and to test data in their own way. It is obvious that multimedia presentations have a potential of changing the scientific publishing process in the future by transferring the publishing phase as an integral part of the research.

In spite of the search functions of the Internet and electronic libraries a comprehensive retrieval of published information still requires a search to be made using well established specialized databases and sophisticated search functions of the traditional online systems.